Southwest Region University Transportation Center

Applicability of the Technologies of Intelligent Transportation Systems in Commercial Vehicle Operations at the Port of Houston's Intermodal Marine Container Terminal with Case Studies of Existing Systems

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APPLICABILITY OF THE TECHNOLOGIES OF INTELLIGENT TRANSPORTATION SYSTEMS IN COMMERCIAL VEHICLE OPERATIONS AT THE PORT OF HOUSTON'S INTERMODAL MARINE CONTAINER TERMINAL WITH CASE STUDIES OF EXISTING SYSTEMS

by

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EXECUTIVE SUMMARY

This research investigated and analyzed certain operating procedures at the Barbours Cut Container Terminal at the Port of Houston. In-depth study was made of the delays associated with these operating procedures as they relate to trucking operations.

The first step taken in the research was the development and administration of a survey of the truck operators. The area that caused the most trouble for the truck operators was the gate operations. Thus it was chosen as the area to be studied in greater depth.

In addition to surveying the truck operators at Barbours Cut Container Terminal, the tasks undertaken included (1) gathering background information from other ports and terminals around the country, (2) interviewing Barbours Cut personnel, (3) collecting gate processing data, and (4) providing recommendations for improving gate operations.

The proposed solution takes advantage of the existing Intelligent Transportation Systems (ITS) technologies that have been implemented at other ports around the country. The solution was designed to address the primary problems.

ABSTRACT

The scope of the research includes identifying problems with the Barbours Cut Container Terminal gate operations problems and developing a viable solution to remedy those problems. The study will consist of a detailed analysis of Barbours Cut's gate operations and will introduce various alternatives with the objective of reducing truck in-terminal dwell times (sometimes called 'truck turn times'). Included among the alternatives are advanced technologies in the areas of electronics, computers, and communications. These advanced technologies applied toward improving transportation are collectively called Intelligent Transportation Systems (ITS) technology. (This was formerly known as Intelligent Vehicle Highway System—or IVHS—technology.) These alternatives will increase the terminal's productivity by increasing efficiency, including an increase in the productivity levels of the more than one hundred trucking firms serving Barbours Cut Container Terminal, and they will maintain local compliance with the Clean Air Amendment Act (CAAA) of 1990. In addition to increasing the productivity, these alternatives will provide a safer terminal environment by reducing congestion.

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CHAPTER 1. INTRODUCTION

PROBLEM STATEMENT

The objective of this study is to investigate and analyze certain current operating procedures and the associated delays of the Port of Houston's Barbours Cut Container Terminal as they relate to trucking operations.

The specific aspect studied and presented here will be gate operations and the associated paperwork process involved with landside delivery and pickup of marine containers. Much of any truck's dwell time within a marine container terminal is dependent upon the terminal's gate transaction system. These dwell times are also a measure of a container terminal's landside access efficiency level. The current system has a truck paperwork rejection rate of approximately one in every five trucks. A rejection is what occurs when a truck driver attempts to process incomplete or incorrect paperwork. The terminal is unable to process this information and rejects the transaction. The driver must then contact the dispatcher, shipping line or freight forwarder to correct the paperwork before the terminal can successfully process the paperwork. This rejection rate further slows down the current system by causing a bottleneck effect in the gate processing queue.

OBJECTIVE OF RESEARCH

The scope of the research includes identifying problems with the Barbours Cut Container Terminal gate operations and developing a viable solution to remedy those problems. The study will consist of a detailed analysis of Barbours Cut's gate operations and will introduce various alternatives with the objective of reducing truck in-terminal dwell times (sometimes called 'truck turn times'). Included among the alternatives are advanced technologies in the areas of electronics, computers, and communications. These advanced technologies applied toward improving transportation are collectively called Intelligent Transportation Systems (ITS) technology. These alternatives will increase the terminal's productivity by increasing efficiency, including an increase in the productivity levels of the more than one hundred trucking firms serving Barbours Cut Container Terminal, and will maintain local compliance with the Clean Air Amendment Act (CAAA) of 1990. In addition to increasing the productivity, these alternatives will provide a safer terminal environment by reducing congestion.

RESEARCH SCOPE

Research included gathering a working knowledge of gate operations systems and associated problems at the Port of Houston and also at selected ports around the country.

Port of Houston Survey

This study includes a survey of the truck drivers serving Barbours Cut Container Terminal. In the conceptual phase of this study it was determined that little was known about the characteristics of the trucks serving Barbours Cut. In order to better understand trucking operations involved at Barbours Cut, a survey was administered. The survey was made up of five parts: shipment specific, general information, communication information, routing information, and additional comments. These survey questions—combined with personal interviews with truck drivers, International Longshoreman Association (ILA) gate clerks and Port of Houston terminal employees—were used to identify and understand operating procedures and perceived problems and challenges of the current system. Details of the survey are described in Chapter 4 in the section titled 'Barbours Cut Container Terminal Survey.'

"Nationwide Study"

While the data focus of this study is the Port of Houston's Barbours Cut Container Terminal, the field procedure includes a "nationwide study." Various terminals were selected for field visits based on the technological enhancements in their terminal operations, the size of their facility and the associated problems that come with such large terminals. Several of these terminals are utilizing advanced technologies. The reason for visiting and surveying these other systems was to determine why some of these technologies were used at some terminals and not at others. This information is very valuable if any viable recommendations are to be made for the Port of Houston's Barbours Cut terminal.

The selected terminals were identified with the help of industry representatives and the American Association of Port Authority (AAPA) staff members. Many of the problems uncovered in the "nationwide study" are similar to the ones uncovered at the Port of Houston's Barbours Cut Container Terminal.

The following entities were included in the "nationwide" field research:

1. Port Authority of New York/New Jersey
2. Sea-Land Service, Inc.'s Elizabeth, New Jersey, container terminal
3. Maher Terminal at Port Elizabeth, New Jersey
4. Port of Baltimore's Seagirt Container Terminal
5. Port of New Orleans, New Orleans Marine Contractors, Inc. container terminal

6. Stevedore Services of America operations at Howard Container Terminal in Oakland, California
7. Stevedore Services of America's container terminal in San Francisco, California.

The specific details of the results of these field investigations are examined in the section on case studies in Chapter 6.

RESEARCH METHODOLOGY

In order to get a better understanding of the inner workings of an operation like a marine container terminal, it was necessary to gather empirical data by conducting interviews and surveys, and by witnessing management decisions made on a real-time basis. Priorities of the management were identified, and it was determined whether those priorities carried down to the front-line employees. From within the terminal system, insight into attitudes of employees about the existing system can be gained. Procedural changes which the front-line employees feel need to be implemented were identified. This type of information is crucial if valid recommendations involving operating procedures are to be made.

In some cases the information sought for this study was viewed as proprietary by mid-level terminal management. In such cases the procedure followed involved approaching upper management and gaining their support by explaining the benefits of this study. At this point the employees, after being advised that the interviews were approved by management, were very cooperative and commented freely.

Also included in this research study are the numerical data collection and analysis. Primarily, the numerical data consist of estimations of time periods associated with various gate-truck processing operations. By analyzing this data, and merging this information with employee and labor union wages, the cost of the current system can be approximated. This information is useful in defining alternatives to the current system.

ORGANIZATION

This report is organized into eight chapters. Chapter 1 provides an introduction and gives a brief overview of the problem, the objective of the research, and the scope of the field research involved.

Chapter 2 provides a brief history of containerization, the importance of marine container traffic, types of terminals which exist and their characteristics, and concludes with the important role that labor unions play in this area of the transportation industry.

Chapter 3 gives a detailed view of gate transactions and the process trucks must follow when they come to Barbours Cut Terminal. This will include the necessary paperwork associated with every container movement and the generators and receivers of that paperwork.

Chapter 4 discusses some of the problems uncovered at ports and container terminals visited "nationwide." This chapter will also discuss the results of the Barbours Cut survey.

Chapter 5 describes the analytical data collection process and provides a compilation of that data. It also includes estimates of the cost of Barbours Cut's current operating process.

Chapter 6 explores various ITS technologies which could be used in marine container terminal applications and lists case studies of some of those systems currently in operation.

Chapter 7 provides recommendations to help reduce gate processing times. This chapter explores costs associated with the recommendations and how those changes could be implemented.

Chapter 8 summarizes the report and its findings as well as identifies further research.

CHAPTER 2. LITERATURE AND BACKGROUND INFORMATION RESEARCH

GATE TRANSACTION RESEARCH

Literature documenting research on marine container terminal gate transaction procedures is, at best, very limited. The most relevant study found concentrates on modeling the entire trucking operation process from entrance to exit of a marine container terminal in New Orleans (Givіden 1984). This study attempts to model all possible scenarios a truck driver may experience upon entrance to a terminal. This model includes times involved with container mounting, chassis parking, drive times from one station to another within the terminal system, walk times to and time spent on the telephone, etc. Many processes of this model taken from a terminal in New Orleans, New Orleans Marine Contractors, Inc. (N.O.M.C.), are similar to the ones found at the Port of Houston's Barbours Cut Container Terminal. The differences, however, are significant enough to prevent applying the entire N.O.M.C. model to Barbours Cut. Some of those differences are in N.O.M.C.'s ability to exclude truck operators from handling or producing pertinent paperwork like permits, equipment interchange reports, transaction requests, and inspection reports. These items will be closely examined and their importance to gate operations investigated.

CONTAINER HISTORY

In order to better understand the implications of changes which can be made at the marine container terminal, the system evolution must be studied.

The idea of containerization as a truly intermodal tool was developed by a trucking company owner named Malcolm MacLean. Mr. MacLean transported goods on an interstate level. He found that his business was being adversely affected by the lack of uniformity among individual state laws governing trucking operations. He soon found that by utilizing the railroad industry he was able to bypass much of his over-the-road problems. It was at this time that he developed what is known today as the Trailer On Flat Car (TOFC). His next step was to adapt his trailer and remove the wheels so the "trailer" could lie flat on the rail car and the Container On Flat Car (COFC) was born. This occurred in 1954-1955. It wasn't until after these two ideas were realized that Mr. MacLean gave thought to the idea of transporting his containers on the decks of seagoing vessels. This was the start of a new method of containerized intermodal transportation.

As a result of its intermodal form, the container has contributed greatly to international trade development. Containers have been adapted to transport practically all types of cargo. Containers now carry everything from dry bulk materials, livestock, fruit and clothing to cars and boats.

CONTAINER IMPACT ON U.S. TRADE

One common way of evaluating a freight transportation system is by the volume and monetary value of goods transported. According to a 1992 Transportation Research Board study, the value of containerized trade in the U.S. is fast approaching the $200 billion per year mark. Peak efficiency in such a large part of the American economy is of paramount importance. This is especially true if the U.S. intends to remain competitive in the global marketplace and lower prices for its consumers.

The most efficient form of intermodal container freight transportation requires seamless, uninterrupted flow between modes. One of the most expensive transfer points in this transportation system is the idle time between the unloading of containers from the ship and the time when the truck with the loaded container drives away (or, if traveling by rail, the time of departure of the container by railroad). One noted author on the subject goes so far as to say that "*the transfer of cargo between ports and inland transport is 'one of the weakest, least efficient, and most costly links in the intermodal transportation chain.'* " The consumer pays to have goods travel from point A to point B. While the ship sails, this is considered value added time. The time the container sits idle in a container yard is not considered value added time. The consumer is paying to have goods moved, and, because of system inefficiencies, must also pay to have goods sit stationary while paperwork is filled out and permits are obtained.

The U.S. Department of Transportation's Maritime Administration (MARAD) reported the following values for the top 12 U.S. container ports in its 1992 report to Congress.

Table 2.1

Port	1990 TEUs	1991 TEUs
Los Angeles, CA	1,454,621	1,501,400
Long Beach, CA	1,214,312	1,354,387
New York/New Jersey *	1,210,173	1,186,251
Seattle, WA	767,303	752,211
Oakland, CA *	578,892	655,465
Charleston, SC	558,852	539,260
Tacoma, WA	486,319	534,955
Houston, TX *	370,069	362,412
Norfolk, VA	358,894	350,027
Savannah, GA	313,208	352,526
Miami, FL	296,188	354,750
Baltimore, MD *	271,134	257,128

(*) Involved with this study.
Source: Excerpt from PIERS, Ports Import/Export Reporting Service, Journal of Commerce
Note: (TEUs) Twenty-foot equivalent units are the number of containers measured in twenty-foot equivalents.

According to the MARAD report, the first five ports account for 55 percent of total U.S. waterborne container cargo based on twenty-foot equivalent units (TEUs).

Today, some people might find a similarity between the birth of the interstate highway system and the birth of intermodal container transportation. When they both became a reality, they forever changed the face of transportation. However, today's demands on these systems far exceed the demands placed on them 30 years ago, and their levels of service continue to decrease. Much like the highway system, the intermodal container transportation system must turn to emerging new technologies to keep the system efficient and competitive until more efficient alternative systems are in place.

PORT AND TERMINAL TYPOLOGY

There are many types of ports and terminals in the United States. It is important to understand the difference between the "port" and the "terminal." The relationship is much like a set (port) and a subset (terminal). An example to help explain the difference between the port and the terminal is that the port can be likened to a country and the terminal can be likened to a city within that country. Most countries have many cities within them, and most ports have many terminals within them.

Types Of Ports

Generally, there are two basic types of ports in the U.S.: the "landlord" port, and the "operating" port. In some cases, ports are a combination of the two. The landlord port operates much like the name implies; the terminals within the port are leased for private operations. For example, a steamship line at the Port of New Orleans, Sea-Land Service, Inc., leases a terminal

from the Port Authority of New Orleans. Sea-Land markets and attracts its own business. Sea-Land hires its own employees and leases the cranes required for moving, loading and unloading containers from the Port Authority. The Port Authority is not involved with the management of Sea-Land's business. Sea-Land merely pays for the usage of Port Authority space and equipment. The Port Authority of New Orleans also assesses a fee on the total amount of traffic Sea-Land generates through the port. This is the landlord system.

The other system is the "operating" port. An example of an operating port would be the Port Authority of Houston. The Barbours Cut Terminal within the Port of Houston is operated and managed by Port Authority personnel. The Port Authority is directly responsible for hiring and management decisions within the Barbours Cut Terminal offices.

It is not unusual to find ports which have a landlord policy on some of their terminals but also operate some of their other terminals. The Port of Baltimore, under the auspices of the Maryland Port Administration and the Maryland Department of Transportation, is an example of this form of operation.

Types Of Terminals

Similarly, there are two basic types of container terminals. The two types are "wheeled" and "grounded." There are distinct advantages and disadvantages associated with both terminals types.

The "grounded" container terminal gets its name from the fact that containers are placed flat on the ground. An advantage to this type of system is that it is not necessary for the terminal to provide a chassis for every container. Another advantage to a grounded operation is that the terminal operator has the opportunity to move high volumes of containers through the terminal with a relatively small area of port real estate. According to Warren Atkins, a grounded system may accommodate as much as 325 TEUs per acre, versus a chassis operation, which will accommodate only 70 TEUs per acre. Unfortunately, waterfront real estate is at a premium, so for many terminals the cost of expansion is prohibitive. By having a grounded system, the terminal operator may stack containers up to five containers high. This greatly increases the capacity of a container terminal yard. Another important advantage of the grounded operation is the ease of transition to a computerized operation. This is possible because of the extensive use of straddle cranes. These cranes can be computer controlled and directed from a central office.

The drawback to this type of system is that container movements are slow. It will require more time for a movement to be made if the container to be moved is on the bottom of a stack of five containers. Further, every container requires a terminal employee to operate a "straddler" or other equipment to load each container on or off a chassis for each movement. The truck driver

does not have the capability of entering the terminal, attaching the cab to the desired chassis and container, and departing. This means slower delivery times for the terminal's customers. Another problem stems from poor foundation design which results in ground settlement. Since most terminals are very near water, it is not unusual to have settlement occur. Should this occur under a "grounded" operation, the damage to containers and cargo could be costly. There is a tremendous amount of downward force on the bottom container in a five-high stack, and, if there is differential settlement under that container, then contortion and buckling are liable to occur. Probably just as important in this type of operating environment is the required usage of heavy container handling equipment, such as straddlers and transtainers, and the impact of these machineries on maintenance of pavement surfaces.

The "wheeled" container operation gets its name from the fact that each container is mounted on a wheeled chassis. The advantage of this type of operation is that all movements are very rapid. When a truck drives onto the yard, all it has to do is back up to the chassis, hook it up and go. This gives the truck operators a much quicker turnaround time. This is beneficial for both truck operators and terminal operator because long truck queues associated with grounded operations are absent. The shipper benefits as well because cargo can be delivered much faster. Another time-saving benefit of this type of system is that as each container is lifted off the ship it is placed directly onto an Over The Road (OTR) chassis and can be driven out by a truck driver. Grounded operations require the container to be placed onto a yard chassis and taken off by a straddler or transtainer and stacked. When the truck arrives to pick up the container, it has to be loaded by the straddler or transtainer again. By requiring less container handling, the wheeled operation experiences much less container damage.

The drawback to this system type is that it is land-intensive. Since urban coastal land is at a premium, the cost for this type of operation is much higher. Another drawback is that a chassis must be supplied for every container coming off the ship. This type of operation requires large numbers of in-terminal truck drivers to have a chassis ready to be loaded for each container as it is unloaded from the ship.

Both types of terminals have their advantages and disadvantages. Which system is "better" depends entirely on the objectives of the terminal operator, the operating conditions, and space constraints under which the operator must work. In the case of Maher Terminals in Elizabeth, New Jersey, a "grounded" terminal operates within a couple of miles or so from Maher's "wheeled" operation.

LABOR RELATIONS

Prior to this research, the degree of influence of labor unions upon port operations was not clear. Not until interviews were held with the entities involved with container transport operations was it realized (by this researcher) just how influential labor unions actually are in port operations. In some operations there exists an underlying, and in some cases overt, feeling of a management-versus-labor type of relationship. There were, however, some good examples of what is possible when management and labor work closer together. Labor organizations contain the front-line workers who can make a terminal or port attractive to shipping lines. This fact can mean the difference between a terminal remaining in operation or not. It can be shown that two terminals with the same number of labor workers can have a noticeable difference in the rate of container throughput due solely to one terminal having better relations with its labor workers. Satisfied workers are more productive.

During the course of the literature research, much of the information located concerning labor unions tended to be negative. A few examples of this were found in Gerhardt Muller's "Intermodal Freight Transportation":

> *...For the most part, labor unions oppose improvements in intermodal transfer efficiencies where such progress will reduce the amount of manpower required....Labor union opposition had and, in some cases, still continues to slow land-water intermodal progress considerably....Labor unions have delayed if not stifled intermodal innovation,....Shipping lines are discouraged from making intermodal improvements because they fear alienating union interests, and because any expenditure on research and development runs the risk of being wasted if resulting improvements are rejected by unions.*

Many people in the marine container transport industry feel that there is an important institutional impediment to more productive and efficient container port operations. This "impediment" is the contractual arrangements with the labor unions and their consequential effects on congestion and operating efficiency. MARAD's December 1992 Report to Congress states:

> *By operating marine terminal gates over longer hours, the port experiences a substantial increase in overall productivity and utilization of its assets as well as a decrease in congestion surrounding the port area because truck and train movements can occur during off-peak hours. In many cases, however, ports have faced a reluctance on the part of some labor union locals to extend operating hours....This issue is especially important to container ports.*

This MARAD report goes further in reference to the Transportation Research Board's (TRB) Phase 1 report in saying: "...the unwillingness of union locals to permit earlier opening of gates without requiring overtime pay for an entire crew appears to contribute to the port's inability to operate longer hours." The TRB report has these comments concerning labor unions:

> *...One of the major impediments to operating longer hours has been the unwillingness of some seaport labor union locals to change work rules to reduce the cost of opening the terminal gates during early morning or early evening hours....Although the longshoremen unions have acceded to many of the technological changes in the industry, some work rules continue to reduce the ability of terminal operators to improve throughput.*

These examples of union input in container terminal operations primarily involve changing the facility operating hours. These changes include more hours for the labor union employees. There seems to be considerable difficulty negotiating mere changes in working hours which ultimately result in no lost jobs. One can anticipate the reaction to the introduction of a new automated system which has the potential of eliminating 80 percent of the office union personnel.

Many terminals involved with this report have found a noticeable reduction in truck traffic congestion by merely adjusting their operating hours. In most cases this has required union laborers to open the gates an hour earlier or remain open an hour later. The policy of keeping gates open during the lunch hour has eliminated a tremendous backlog of trucks waiting to enter and exit the terminal. These operational changes occurred as a result of terminal operator and labor union negotiations.

An owner of a west coast trucking company felt that one reason for not achieving the efficiencies and productivity levels possible at container ports was that labor unions "don't have to answer to anyone." He felt that labor unions had been given so much power that to go against their policies could result in extremely costly consequences. One truck driver went on to say that any terminal which claimed to operate on an eight-hour basis for container movements was exaggerating by three hours. In fact, he felt that this five-hour work day discouraged the better drivers from accepting the container port assignments. This is especially true for drivers who get paid on a load-by-load basis. Long lines at the container terminal, coupled with just a five-hour work day, translates to decreased profits. The truck operator proceeded to break down the eight-hour, 8am-to-5pm terminal work day like this: Gates don't actually open until 8:30; the gate operators usually close down the gates for lunch at approximately 11:40 and reopen the gates at 1:30. The gates remain open until 4:00, at which time the gates close so that any trucks still in the terminal can be out by 5:00. (This adds up to slightly more than five hours, but the truck operator's comments are noteworthy.) During the course of this investigation a truck driver arrived at the

west coast container terminal entry gate under observation and tried unsuccessfully to enter the facility. The truck driver had apparently rushed to the terminal to get in before the gate closed for lunch but was too late and had to park the truck and wait, feeling somewhat disgruntled. This occurred at 11:47 a.m.

While the labor unions appear to receive a lot of "negative" press, the president (in 1987) of the International Longshoremen's Association (ILA), Thomas W. Gleason, provided another perspective. This perspective was illustrated in the proceedings from the World Wide Shipping/Ports and Terminals Conference in 1987. Mr. Gleason reminded the conference participants that the ILA shares the same goal as management, which is to improve productivity and maintain a competitive edge. He added that many people have different ideas as to how to increase productivity and at whose expense. Mr. Gleason proceeded to remind the participants at the conference of the sacrifices the ILA has made over the years in human terms.

> *...The ILA knew from the earliest days of containerization that a sharp reduction in man-hours would result from the increase use of containers. An astute longshoremen, upon seeing the shape of a container, called it a "longshoremen's coffin."...We took steps to make sure it wasn't.*

The ILA realized that productivity would greatly increase with widespread usage of containers and that manpower would be reduced. The decrease in longshoreman work hours, combined with the increase in productivity, led to creation of the Guaranteed Annual Income (GAI). Mr. Gleason also stated:

> *The simple purpose of GAI was to cushion the blow of containerization, to allow automation to flourish and more importantly—and more humanly—to signify to the longshoremen that the industry recognized his contributions over the years and would not cast him aside and label him useless....Some people in the industry see GAI in a different light. They regard it as a curse to the industry.*

Mr. Gleason stated that New York led the way in the area of automation and also experienced the greatest displacement of longshoremen. In 1964 at the Port of New York, the ILA rosters had approximately 25,000 longshoremen. By 1987, that number had dropped to 8,000, and on an average day only about 5,000 longshoremen were actually employed. Mr. Gleason stated that even with these labor force reductions, the Port Authority continues to report record annual amounts of cargo handled. Mr. Gleason concluded his presentation by stating that the ILA certainly has contributed to, and has felt the sting of, automation and is determined to work with management to study and discuss the challenges that lie ahead. He stated that this type of

cooperation is in the best interest of the ports and also in the best interest of the industry. He further stated that the ILA will not falter in its responsibility to its membership.

According to an August 16, 1993 article in the *Washington Business* (an insert in the *Washington Post*) titled "Baltimore's Ships Come In," automation does not come without cost. The article reads:

> *Baltimore acknowledges having one distinct disadvantage to Virginia: Steamship companies using Baltimore must pay millions of dollars each year into an ILA "guaranteed annual income" (GAI) fund for longshoremen displaced or underemployed because of automation....In Baltimore, steamship companies paid almost $12 million into the GAI last year, making shipping costs that much higher. Maurice C. Byan, president of the Steamship Trade Association of Baltimore, estimated that only 575 of the port's 1,800 registered longshoremen work a full 40-hour week, and 300 to 500 do not work each day. About 500 receive GAI payments ranging from a few hundred dollars to more than $30,000 a year, Byan said....*

It is important to note that at many terminals visited there were numerous accounts of labor union-initiated problem solutions. In fact, there is a rich history of innovation by labor, and its participation is not as negative as this report would portray. However, documented literature describing labor-initiated innovation in gate operations could not be located. At one Sea-Land terminal, labor union personnel came up with ideas for modifying existing crane equipment and approached management with their ideas. Management allowed the workers to make changes, and the end result was a noticeable productivity increase. The union personnel were proud of their idea and were determined to make it work. It worked so well that Sea-Land decided to have the changes, invented by union personnel at the New Jersey terminal, adopted at its other terminals worldwide. Other ideas include pre-inspection of containers and chassis so that when they are ready for delivery to the driver, the truck driver turn around time is reduced. This leads to increases in container throughput of a terminal. What is interesting is that there are many such stories about labor union involvement in increasing terminal productivity but none of these ideas pertaining to gate operations could be found in the literature search.

Labor relations play an extremely important part in the feasibility and adoption of ITS CVO technology in the marine container terminal arena. This fact is probably one of the most important institutional issues facing the implementation of more technologically advanced systems. These obstacles have traditionally been overcome with education and retraining. This issue will be explored more thoroughly in a subsequent chapter.

CHAPTER 3. STANDARD OPERATING PROCEDURES

BASIC GATE MOVEMENTS

There are eight basic configurations in which trucks can enter or exit marine container terminals. These are:

Entering the terminal

1. *A tractor with no trailer (bobtail or pup)*
2. *A tractor with a chassis without a container*
3. *A tractor with a chassis and an empty container*
4. *A tractor with a chassis and a loaded container*

Exiting the terminal

5. *A tractor with no trailer (bobtail or pup)*
6. *A tractor with a chassis without a container*
7. *A tractor with a chassis and an empty container*
8. *A tractor with a chassis and a loaded container*

These can be combined to yield 15 usual entering - exiting configuration combinations. These combinations can be broken down in the following manner (entering movement, exiting movement): a bobtail enters the terminal and leaves with just a chassis (1,6); a bobtail enters the terminal and exits with a chassis and an empty container (1,7). These combinations continue as follows: (1,8); (2,5); (2,6 - exchange chassis for another size chassis); (2,7); (2,8); (3,5); (3,6); (3,7); (3,8); (4,5); (4,6); (4,7); (4,8). These fifteen combinations are important because each movement requires a different paperwork procedure. These movements are sometimes classified as either a single move or a double move. A single move merely means that paperwork is required for only one transaction. An example of this would be a loaded container entering the terminal and exiting as a bobtail. The only processing necessary is for the load the truck operator brings to the terminal. A double move means that paperwork is required for two transactions. An example of this would be a case in which a loaded container enters the terminal, is unloaded and the truck operator picks up a full container which has been imported and exits the terminal. In this case paperwork is required for shipping the container brought to the terminal and a completely different set of paperwork is required for taking a container from the terminal—thus the name "double move."

BASIC IMPORT/EXPORT PAPERWORK PROCESS

Understanding the necessary steps involved with gate processing at Barbours Cut Container Terminal, requires understanding the complete path the paperwork must follow. What follows is a basic outline of who generates the paperwork, who must have the paperwork, and who will eventually end up with the paperwork for various truck movements. In order to make the process easier to understand, it will be presented in a flow chart format.

To Return a Chassis to Terminal

Returning a chassis involves the same procedure as returning an empty container. It is a common occurrence to return both the chassis and empty container in one visit. The procedure in this case would be basically the same.

SPECIFIC GATE TRANSACTIONS

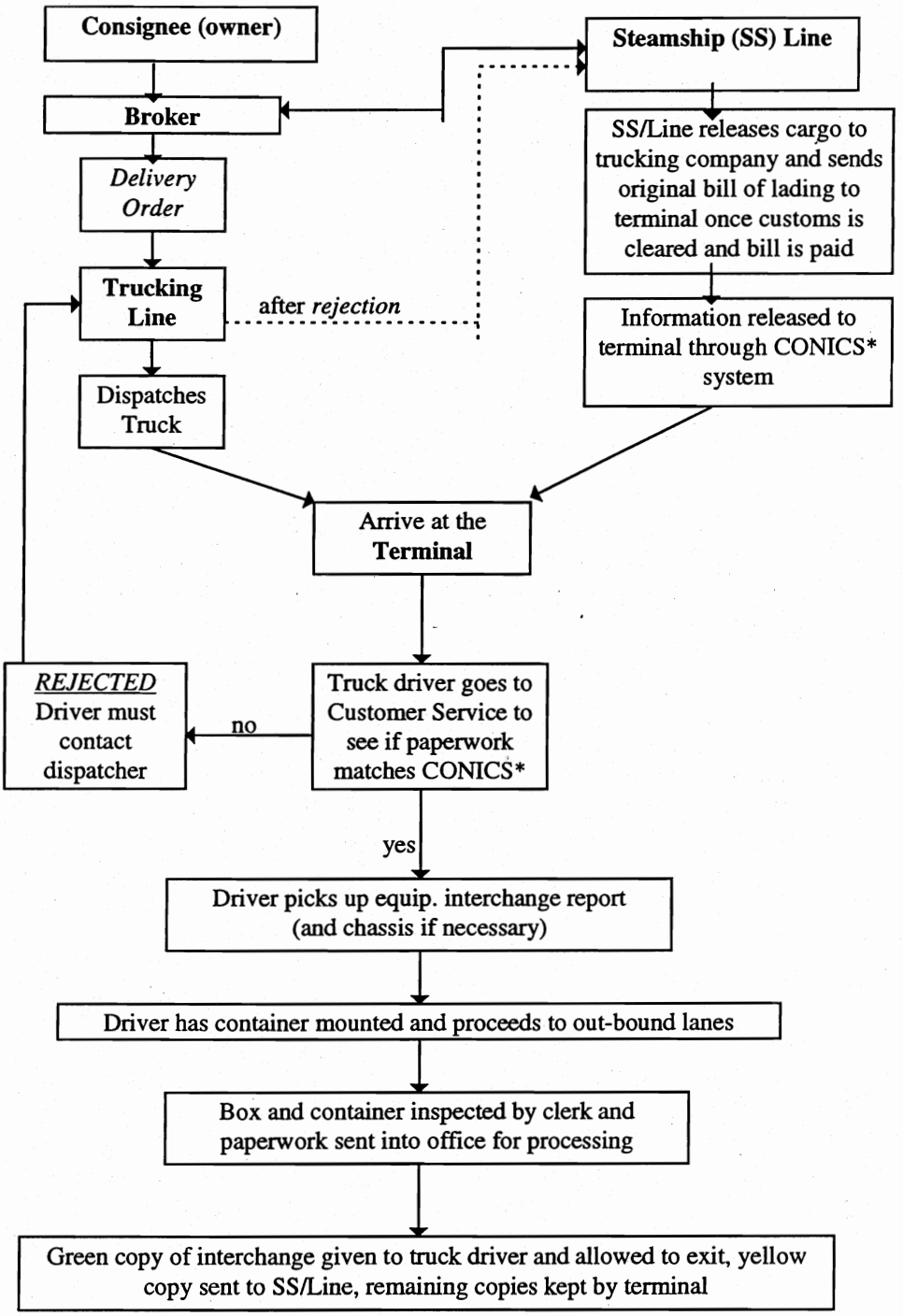
The preceding flow charts do not provide details of each gate processing point. There are two basic (non-reject) gate flows.

Bobtail or Chassis In

If a truck operator arrives at the terminal as a bobtail or with a bare chassis then the gate sequence is as follows:

1. Upon arrival at the terminal the truck operator must stop at the entrance gate and collect a gate pass with the time of arrival stamped on it.
2. The truck operator parks his truck and walks to the customer service building window and fills out a transaction request (TR) which asks for pertinent information about the move the truck operator wishes to make.
3. The TR and gate pass is given to the clerk, who checks the TR to make sure all necessary blanks are filled.
4. The clerk transfers the paperwork to the data entry person, who verifies the information and matches the information on the Port of Houston's CONICS system. The data entry person prints an Equipment Interchange Report (EIR), and this is returned to the truck operator.
5. After the truck operator picks up a chassis and/or a loaded or empty container, he/she proceeds to the outbound gate at the main building where the equipment is surveyed, and all the truck operator's paperwork, including the timed gate pass, is sent into the office by means of pneumatic tubes.

Figure 3.1 Pick Up Import Load (full container)



* CONICS - (Container Inventory Control System) Port of Houston's computer system

Figure 3.2 To Export a Load (pick up empty container for stuffing)

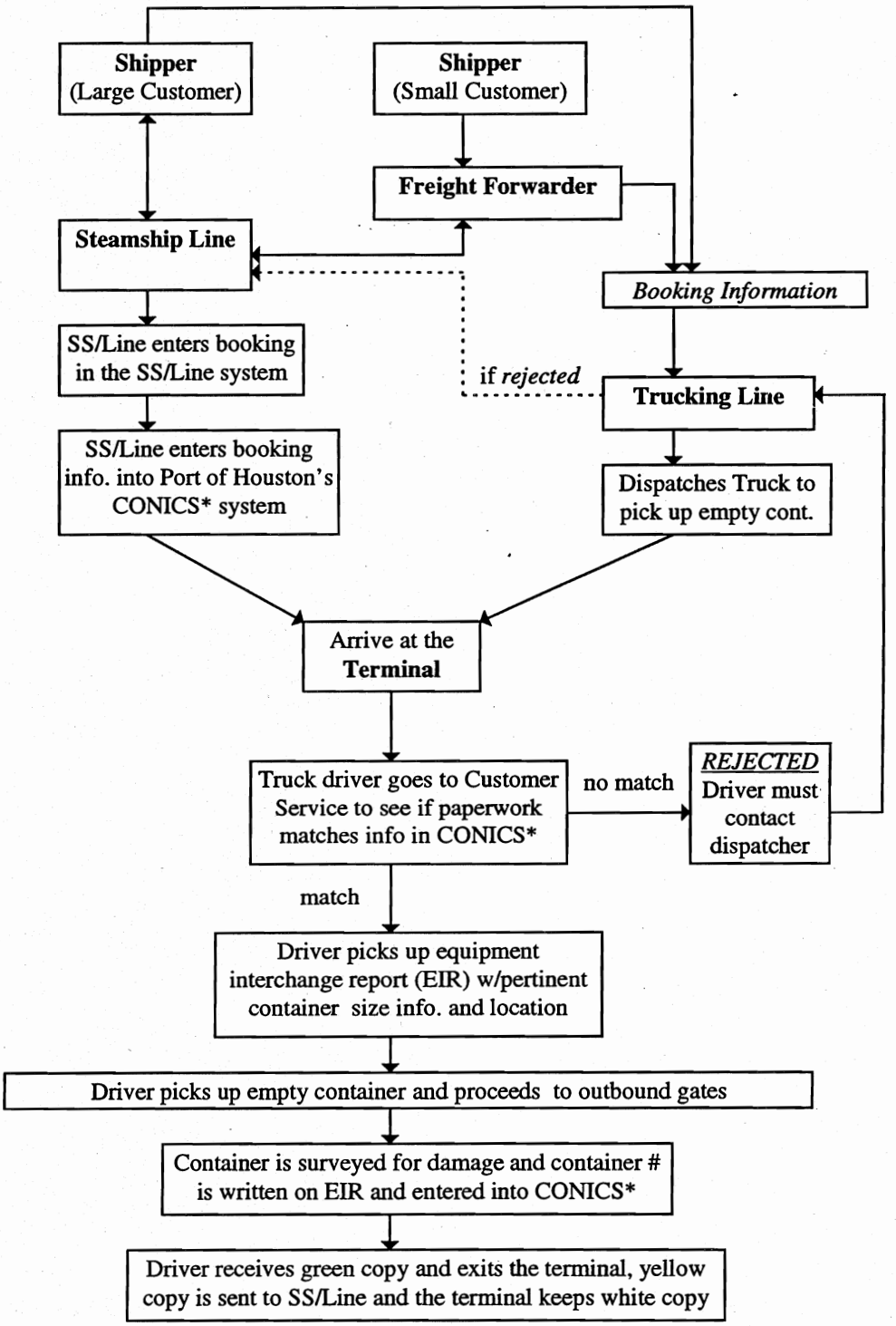


Figure 3.3 To Export a Load (Deliver loaded container to terminal)

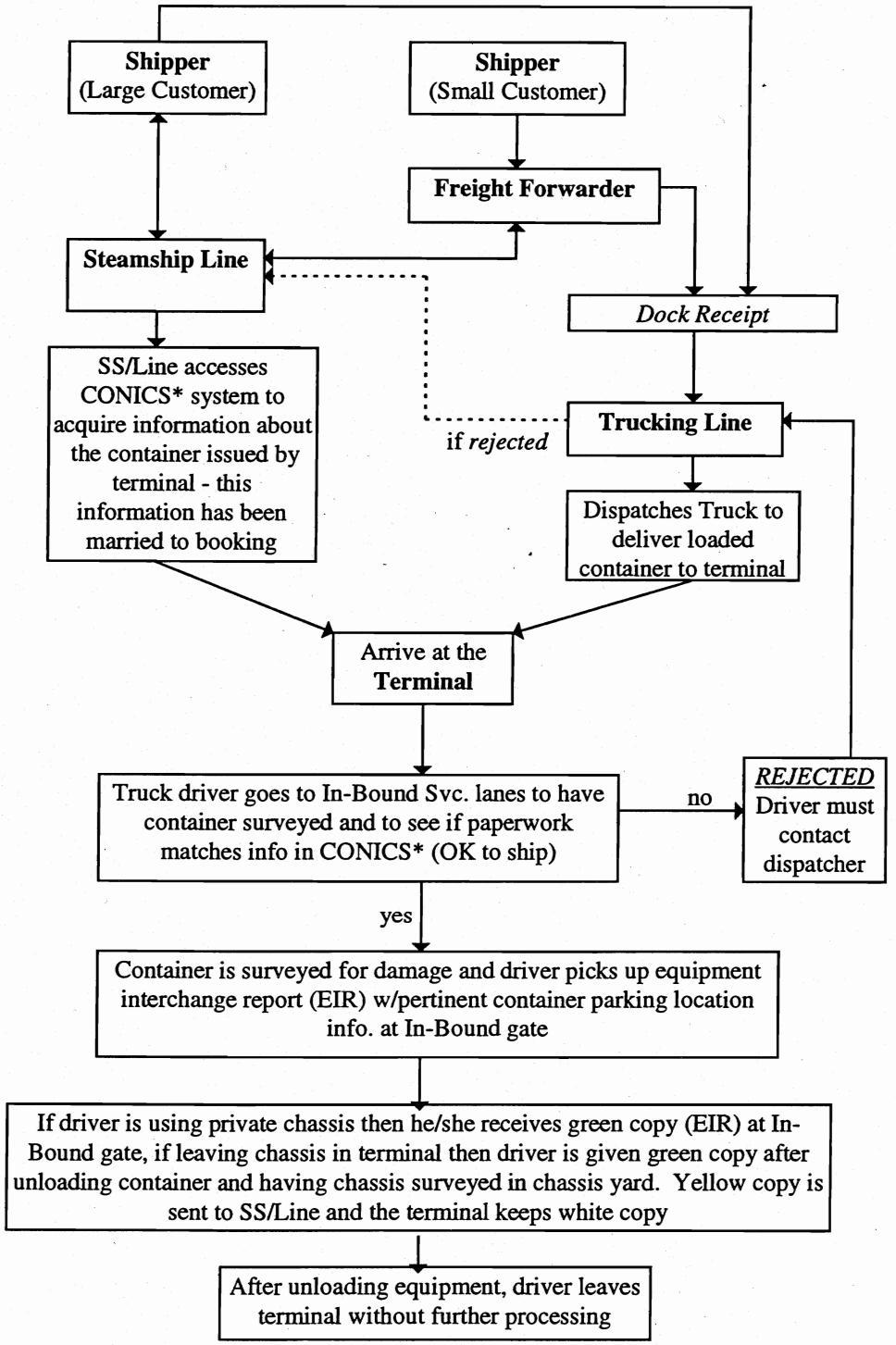
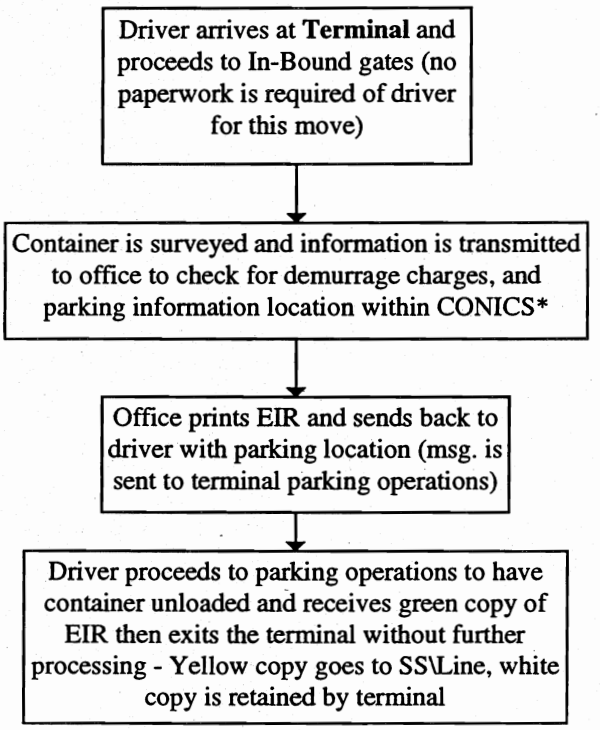


Figure 3.4 To Return an Empty Container to Terminal



6. The data entry staff takes the information from the tube and enters the appropriate information such as condition of container, seal number if container is loaded, container number, chassis number, etc.
7. The truck operator is given the green copy of the EIR and allowed to exit the terminal.

Empty or Loaded Container In

If a truck operator arrives at the terminal with an empty or loaded container, the gate sequence is as follows:

1. Upon arrival at the terminal, the truck operator must stop at the entrance gate and collect a gate pass with the time of arrival stamped on it.
2. The truck operator proceeds to the inbound lanes at the main building. (Truck operator is instructed as to which lane to enter depending upon whether the container is loaded or empty.) If this is a loaded container, then the truck operator must drive to a lane which has a scale; otherwise the truck must go to a lane without a scale and stop.
3. After the truck stops, the gate clerk surveys the container and has the truck operator fill out a Transaction Request (TR).
4. After the clerk fills in weights and checks the truck operator's TR, the clerk places all paperwork, including the gate pass, into a pneumatic tube to be sent into the office for processing by data entry personnel.
5. A data entry person enters information into CONICS, verifies data, prints EIR and places it back in the tube to go to the respective lane. Included with this paperwork is the appropriate container and/or chassis parking location. If the truck operator is leaving the terminal (after unloading the container) with a private chassis, the truck operator is given only the green copy of the EIR. If parking the container and the chassis, then the truck operator is given the entire EIR. After the chassis has been surveyed in the parking yard, the parking clerk will take the complete EIR and return only the green copy to the truck operator.
6. After parking the container (or chassis), the truck operator proceeds to an Out-Bound lane at the main building and hands the gate clerk the gate pass that was received upon entering the terminal and proceeds out of terminal.

If the truck operator is making a double move, then the steps are basically the same. The main difference is that whichever stop the truck operator makes first (customer service building or inbound gate), the paperwork is processed for both moves instead of just one as outlined above. This results in slightly longer processing times. The duration of each of these gate transactions has been timed, and these times are presented in Chapter 5.

CHAPTER 4. SURVEYS TAKEN AND PROBLEMS IDENTIFIED AT SELECTED MARINE CONTAINER TERMINALS/PORTS

During the course of this research, much information was gathered concerning the marine container terminal operations. It was necessary to survey port operations as well as container terminal operations in order to better understand these intermodal transportation system components. These surveys, in addition to personal interviews, uncovered interesting issues and identified problems which can be addressed by Intelligent Transportation Systems (ITS) Commercial Vehicle Operations (CVO) technologies as well as by non-technological methods.

NATIONWIDE SURVEY

Survey Participants

As was stated earlier, background research was conducted that encompassed a survey of selected U.S. ports and terminals. The following entities were included in the research/survey:

- Port Authority of New York and New Jersey
- Sea-Land Service, Inc.'s Elizabeth, New Jersey, container terminal
- Maher Terminal at Port Elizabeth, New Jersey
- Maryland Port Administration
- Port of Baltimore's Seagirt Container Terminal
- Port Authority of New Orleans
- New Orleans Marine Contractors, Inc. container terminal
- Stevedore Services of America operations at Howard Container Terminal in Oakland, California
- Stevedore Services of America's container terminal in San Francisco, California

Type of Survey

No survey instruments were used in this survey (i.e., no formal questionnaire or instrument was utilized). Instead, the "survey" was in the form of personal interviews with general questions concerning operating procedures and questions which were open-ended, allowing interviewees to expound on any problems that they perceived were hampering efficiency levels. These interviewees ranged in station from vice president of a major steamship line, to executives of port authorities, to terminal executives and managers, to labor union workers, to presidents of trucking associations, to the independent truck operators, and through almost all ranks in between.

Problems/Opportunities Identified

The identified problems and opportunities can be divided into two categories: internal and external. Internal problems are the ones which exist within the boundaries of the marine container terminal's entrance and exit gates. External problems are those which concern the truck operator, the trucking company serving the container terminals, the container terminal, the port authority, and legislative and federal/state agencies outside the container terminal. These generally involve traffic to and from the container terminal.

Internal Problems and Opportunities. Some of the internal problems truck operators perceive at the container terminals are as follows:

- *Long waiting lines when attempting to enter the terminal.*

  Preliminary research conducted at one terminal found that trucks had to wait at the entrance gate an average of 42 minutes before they could be served. Times like that—multiplied by 60, 80 or even 100 trucks waiting to approach the gate—can translate into revenue lost for the trucking industry, as well as reduced terminal productivity.

- *Upon entry to the terminal, there exists no first-in first-out policy.*

  Another concern of the truck operators surveyed was waiting in the queue to have a container loaded or unloaded from their chassis (grounded operation) and finding that queues are not served in order of arrival.

- *Waiting in long lines for the opportunity to wait in another long line.*

  Truck operators as well as terminal operators dislike a system wherein the truck operators must sit in their trucks in a long queue and, upon reaching the service gate, are required to leave their trucks and enter the terminal building and wait in another long line inside.

- *Much time is lost when a truck operator arrives at the gate with the required paperwork for a container and places it in a pneumatic tube system whereby the documents are sent into the terminal.*

  These documents are checked and entered into the computer system, after which a location for the parking destination is printed; this is placed back in the tube and sent to the truck operator, who sits idly at the gate. This transaction can take from 6 to 40 minutes depending upon the speed of the data entry clerk.

- *Wasting time looking for a container that has already been picked up.*

  Occasionally a truck operator will arrive at the terminal to pick up a container, and the truck operator and the yard foreman are unable to locate this container, only to learn later that it

has already been picked up by another truck operator, or that the container has been misparked and the exact location has not yet been recorded. A real-time information system doesn't exist.

- *No priority service plan.*

  A problem exists at most terminals throughout the country when containers are given a priority status (these are sometimes referred to as "hot-hatch" containers). In this type of circumstance, time is of the essence to the customer. Unfortunately, in most terminals, no mechanism exists which will allow such a truck operator to be served before other truck operators who are waiting for non-priority containers. This almost defeats the purpose of providing a "hot-hatch" service to the shipping lines' customers.

- *Truck operator-clerk communication problems.*

  It is common to find truck operators who do not read English. This means that the terminal gate operator must take an inordinate amount of time extracting pertinent information from the truck operator and, in some cases, actually fill out forms for the truck operator.

- *The more chances there are to make an error, the more errors will be made.*

  Many mistakes are made in the ingress/egress process because of the need to record information (container number, docking receipt number, delivery order number, etc.) repetitively. These numbers can easily be misread or misrecorded. These mistakes lead to costly, unnecessary delays.

- *No rapid database scanning system.*

  Often, when a truck enters the gate, a manual check of the trucking company's status must be completed. These checks include identifying the company as "approved" to enter the terminal (no outstanding debts owed to the terminal) and ascertaining whether the truck operator has been authorized to represent the trucking company, and has been qualified to transport hazardous classed cargo, etc. This manual check often requires finding the trucking company name on a hard-copy list containing information on thousands of trucking companies.

- *No rapid accuracy checks in place.*

  In some cases the gate clerk is required to manually write a three-letter code which identifies the trucking company entering the terminal. Sometimes, when this information is entered into a computer, the trucking company code is incorrect, thereby terminating the transaction. In the case of one terminal, these coding errors necessitate a separate person responsible solely for checking for accuracy all trucking codes manually recorded by gate clerks before data entry can be performed.

- *Inspection procedures too lengthy.*

  At each egress or ingress container movement, the chassis number and the container number listed on the documentation must be checked by the gate clerk to see if they match the actual numbers displayed on the equipment. Also, the chassis must be checked for "roadability" (brake lights and turn signals functioning properly, tire wear acceptability, etc.).

- *No visual inspection records kept for liability purposes.*

  Each container is given a cursory check for damages upon arriving at or exiting from the terminal in order to reduce liability. There can be times when the trucking company claims that a container was damaged before the truck operator picked it up from the terminal; there can also be claims as well as counter-claims by the terminal operator that the container was damaged while in the custody of the trucking company. There are no pictures or other visual proof of receipt of a damaged container.

External Problems and Opportunities. Many, if not all, internal opportunities listed require implementation by the port authority or the terminal. External opportunities could be solved jointly by trucking companies, the terminal, the port authority, and state and local governments.

One characteristic that is common among most ports throughout the country is the increasing percentage of owner-operated trucks. These owner-operators may lease their services to four or more trucking companies serving the port. This growing segment of truck traffic has been the result of substantial deregulation in the freight transportation industry. Because of the growing numbers of these private owner-operators, there has been a large deficit in information concerning this segment of the transportation community. The surveys, combined with personal interviews, reveal that much of the technological communication equipment is limited to AM-FM radios, citizens band radios, and standard two-way radios which connect the truck operator and the dispatcher. In a surprisingly large number of the trucks inspected, there is no communication system at all. These truck operators received their assignments in the morning or on the previous day and periodically telephoned the dispatcher to receive additional assignments. This segment of the trucking community does not utilize the more advanced technology that is currently on the market.

Perhaps the reason for the prevalence of low-tech communications equipment is the large percentage of short hauls. Much of the truck traffic is repeat container trip movements (i.e., pick up a container at the terminal and deliver it, then return to terminal and pick up another container and deliver to the same destination). Since the majority of the trips are "short haul," the

need for satellite-based tracking systems to obtain real-time location information is perceived as high-tech overkill. In other words, the total cost (initial cost, maintenance cost, training cost, etc.) may far outweigh the benefits.

In order to fairly assign costs for improved container terminal trucking operations, one must identify beneficiaries. Clearly, the trucking company benefits by reducing operating time of personnel (truck operators) and equipment. This directly benefits the customer by reducing the trucking costs of moving containers from the terminal to the unloading destination. One can see that the general public also benefits in other ways. The public benefits from a reduction in exhaust emissions generated by idling and slow moving trucks; and benefits are realized by reducing the numbers of trucks on already congested urban roadways, thereby increasing the levels of service for passenger cars on affected roadways. The public also benefits by experiencing lower prices for goods purchased at retail facilities. These lower prices are made possible by trucking companies passing on lower transportation costs resulting from operating more productively and more efficiently.

Some of the external problems/opportunities uncovered are as follows:

- *Unnecessary trips to the container terminal.*

  Sometimes a trucking company will send a truck operator to the terminal to pick up a container: After waiting in the queue at the terminal gate, the truck operator will find that the requested container has not yet gained U.S. Customs clearance, forcing the truck operator to leave the terminal empty-handed.

- *No dedicated truck access to container terminal/port facilities.*

  Some ports do not have clear unimpeded truck access to their terminals. In some cases, major trucking routes must travel through residential neighborhoods.

- *No communication between railroad and terminal serving trucking operations.*

  Some trucking companies are faced with serving a terminal which has railroad tracks crossing both the facility entrance and exit. The trucks have to wait for long periods of time, often more than once per day, until the train(s) passes.

- *No communication between roadway maintenance forces and trucking operations.*

  There are many times when a local transportation agency has scheduled maintenance on a section of a highly traveled roadway. Trucks leaving the terminal find themselves caught in scheduled "heavy congestion." This type of congestion can be avoided easily.

- *There exists no dissemination of real-time traffic conditions at the terminal.*

  Container trucks are forced to wait in long lines on local roadways due to some type of traffic incident. They are not given the opportunity to reroute.

- *Dispatcher assigned the truck operator to the container terminal during peak terminal business times.*

  Many times port servicing trucks find themselves experiencing long delays at the terminal because the dispatcher sent the truck operator(s) without regard to peak terminal truck traffic hours (usually at 0800 and 1300 hours).

- *Dedicated truck toll express lanes do not exist for the trucks that must traverse toll roads several times per day every day.*

  The truck routes to and from container terminals involve toll roads. The toll gates restrict truck traffic to certain lanes. Owing to longer vehicle lengths and lower acceleration rates associated with trucks, long queues of trucks tend to develop periodically in these lanes.

- *Real-time congestion information systems do not include the port serving the trucking community in dissemination deployment plans.*

  Many cities are developing Advanced Traffic Management Systems (ATMS) with the ability to provide real-time traffic information to the public through Advanced Traveller Information System (ATIS)-equipped vehicles, hourly traffic reports via AM-FM radio, and, in some areas, through Highway Advisory Radio (HAR). Unfortunately, as surveys have shown, many of the trucks serving ports do not have ATIS equipment or even AM-FM radios. Many of these truck operators must travel without the aid of available real-time congestion information.

- *Restricted access to pertinent information.*

  In some terminals throughout the country, a trucking company must wait for a specific time of day to call and find out if certain containers are cleared for release from the terminal. Unfortunately, even within that limited time segment, the trucking company is limited with respect to the number of containers on which it can request information.

Many of these internal and external concerns could be viewed as ITS-CVO technology opportunities. As technology continues to progress, we find that the varied applications of these technologies to solve transportation problems grows exponentially. The marine container port arena is certainly no exception. The section titled "Case Studies Of Existing Systems" in Chapter 6 will illustrate how ITS technology is being used at some ports and terminals today.

BARBOURS CUT CONTAINER TERMINAL SURVEY

Survey History

There were two different types of survey methods used to obtain information concerning Barbours Cut. One method involved actually developing a survey questionnaire specifically for the truck operators, and the other involved conducting personal interviews (not limited to truck operators), much like the nationwide survey.

A Transportation Research Board survey conducted at ports all over the country was used as background survey research material. Also included in the preliminary stages of this research project was a tour given by Port of Houston personnel. The tour consisted of meeting with H. Thomas Kornegay, the Executive Director of the Port of Houston, and his staff, and of a guided tour of much of the Port of Houston's facilities.

The survey utilized four basic steps which were as follows:

step I.

The first step was to identify the commercial carriers serving the port. The port authority provided a list of approved commercial carriers who transport goods to and from the port's terminals. Operating procedures were then identified and analyzed.

step II.

A survey for the truck operators was formulated. The survey was designed to obtain the maximum amount of pertinent information in the least amount of time. The survey gathered information concerning congestion within the port and also in transit to and from the port. The survey gathered information concerning the communication systems in place between operators and their respective dispatchers and also between operators and other operators. There were questions relating to existing traffic update information and desired traffic update information, routes usually taken, and perceptions of highway design inadequacies along routes.

Typically there were 4 parts for the operators:

1. Shipment Specific
2. General Information
3. Communication Information
4. Routing Information

step III.

A pilot survey was run. The survey could not be too lengthy nor could it omit pertinent questions. Modifications were made prior to the final survey administration. The survey for the operators was administered while the truck was sitting idle (in the queue) at Barbours Cut Container Terminal.

step IV.

The final step in the study was to compile data gathered in the surveys and identify problem areas in port-related intermodal movements. Based on this information, recommendations were made as to which areas required further attention.

Survey Implementation

Once an acceptable format for the survey was established, a pilot survey was run on April 21, 1993. The pilot survey was administered in two ways. The Port of Houston terminal personnel helped with distributing surveys at the terminal entrance gate. For the pilot, ten (10) survey instruments were handed out to truck operators. As the operators checked in at the entrance gate, they were asked to fill out the survey and hand it to the attendant at the exit gate. Ten (10) more surveys were intended to be administered personally. The personal surveys were done by approaching truck operators and asking if they would allow the person conducting the survey to board the truck and conduct the survey orally.

In a four-hour period, only five (5) of the anticipated ten (10) surveys were completed orally. In most cases the surveyor encountered a lack of interest and an unwillingness to cooperate on the part of the truck operators. Many times the surveyor was given the excuse that the survey would take up too much of the operator's time. (Practiced time trials indicated that the survey would take approximately 4 to 7 minutes to complete and could be administered while the operators waited in the terminal. Trucks currently have an average in-terminal dwell time of approximately one hour, the majority of which is idle wait time.) The five surveys which were completed ranged in time from 5 minutes to one hour and 10 minutes. The truck operators who cooperated wanted to explain their personal problems and their truck driving problems. The common complaint was that they are treated poorly by the driving public (cars cutting in front of them and expecting them to decelerate rapidly), by the terminal operators (making the truck operators wait for long periods of time), and, in some cases, by the companies they work for (sending the truck operator to the terminal without the necessary paperwork). Just in those five surveys, questions which needed clarification were identified by the truck operators. The truck operators themselves helped with clarifying those questions for the final survey.

Of the ten pilot surveys which were handed out to the truck operators at the entrance gate, only two were returned. The questions which needed clarification were not answered, or inappropriate responses were obtained. With this lack of interest, it was anticipated that approximately 20 percent of the final surveys would be returned. This approximation held true. On May 20, 1993, from 8 a.m. to 4 p.m., 350 surveys were administered and 71 were returned. Appropriately, truck operators making more than one trip to the terminal during this period were permitted to complete only one survey.

Survey Questions And Responses

Each survey question was followed by several choices. A copy of the survey instrument and a tally of the 71 truck operators' responses can be found in Appendices A and B. Following each question is the number of truck operators who answered, together with their respective responses. It is important to note that not all responses total 71, indicating that not all questions were completed on all forms. All questions requiring written information are also included in Appendix B.

Problems/Opportunities Identified

It was evident from the comments provided by the truck operators completing the survey that Barbours Cut Container Terminal is experiencing some of the same problems faced by other terminals surveyed. It is apparent that there are many problems within a terminal that can be addressed; however, this report focuses primarily on gate operations. During the data collection process, quite a few details and limitations of the current gate processing system surfaced. Some of the more prevalent problems can be categorized into two groups: rejects and inherent delays.

Rejects. Rejects are problems which cause untimely delays for the truck operators and unnecessary terminal operator expense. The occurrence of a reject causes the truck operator to leave the queue and contact the trucking company's dispatcher. The dispatcher in turn contacts the shipping line, who either provides the correct information to the trucking company and/or inputs new information directly into the Port of Houston's CONICS system. After this takes place, the truck operator must reenter the queue at the terminal. Typical reasons for rejects are as follows:

- *Booking not set up for Hazardous Material load*

  Sometimes a truck operator arrives at the terminal and submits paperwork for processing which states that the cargo is a non-hazardous commodity, only to find out that the actual cargo *is* a hazardous material which will require special permitting, routing restrictions, and special placards placed on the container.

- *X'd by the steamship line (e.g., customs not yet cleared, customer hasn't paid bill, SS/Line clerk forgot to remove X from field on Container Inventory Control System when supposed to)*

  When the truck operator arrives at the terminal and submits paperwork for processing, the data entry clerk enters the required information and checks for clearance to release the cargo. Sometimes the steamship line has entered an 'X' or an 'H,' which tells the data entry clerk not to release the container. This can occur for various reasons. Sometimes it is simply an omission on the part of the steamship line. When the cargo was cleared by customs or other agent, the steamship line simply "forgot" to remove the 'H' or 'X.'

- *Shipping Line or Freight Forwarder needs to increase the number of spaces booked on a ship*

  A truck operator arrives at the terminal to pick up an empty container and there is no reserved space on the ship for the returned, loaded container to be exported.

- *SS/Line has already sailed and load just arrived*

  When this occurs, the container must be rebooked on the next available vessel.

- *Booking information not on file*

  A truck operator arrives at the terminal with the necessary paperwork but the information has not been entered into the CONICS system. The terminal will not proceed with transaction without the necessary information in the system.

- *Truck operator has no documentation*

  Some truck operators and trucking companies are unaware of the necessary paperwork and attempt to make a transaction without proper documentation or information.

- *Unable to locate available chassis*

  Sometimes the truck operator has clearance to receive a container but the terminal has no available chassis for the truck operator to use. The truck operator is forced to wait for an indefinite period of time until another truck operator returns a chassis, or must leave the terminal and return the following day.

- *Papers show wrong Port of Discharge (very common)*

  Quite often, the truck dispatcher has given the truck operator erroneous or incomplete information. The terminal has to make sure the Port of Discharge in CONICS matches the booking information provided by the truck operator.

Inherent Delays. Inherent delays are those delays that do not require the truck operator to drop out of the queue to have a correction made by the trucking company dispatcher. Inherent delays are time-consuming and avoidable. However, in many cases, in order to avoid these delays, there must be some modest changes in the current system. Following are some examples of inherent delays.

- *Cargo is traveling In-Bond (requires special handling)*

  When paperwork is processed for In-Bond loads, then it must be forwarded to a designated data entry person who must check to make sure all the necessary accompanying customs paperwork is included. Often a call to the shipping line is required.

- *Booking number is missing a prefix digit or number is off by one digit (requires data entry person to search system)*

  Sometimes, while the booking number is being written down, a digit may be dropped or a letter may be omitted. It takes some time for the data entry person to scan similar numbers and identify what the number provided by the truck operator is supposed to be. This could be the fault of the gate clerk, the truck operator, the dispatcher, or even the freight forwarder or the shipping line. It is relatively easy to encounter an error or omission when a number must be written by many people on many different forms.

- *Lanes are blocked due to lead truck's paperwork processing (subsequent trucks must wait for lead truck to move in order to proceed)*

  Unfortunately, when a truck operator has his paperwork processed and returned before that of the truck which is waiting in front of him or her, the truck operator must wait for the truck blocking the lane to be processed. Sometimes there are two trucks blocking the lane, both of which are waiting to have paperwork processed.

- *When trucks enter the container loading/unloading area they are faced with an inequitable servicing system.*

  Because of the economics of a terminal system, priority is given to loading and unloading of the docked vessels. Because the same transtainers that are used for "working" the ship are also used for loading and unloading trucks, the trucks often wait for long periods of time. (The economics of a container terminal dictate that docked ships be given a higher priority than waiting trucks.) If a truck is waiting to be serviced (loaded/unloaded) at a remote area of the terminal, it may have to wait for as many as three to four hours. If the transtainer is working an area where there are a number of trucks waiting, then it will continue to service those trucks rather than leave that area to go to the remote area of the

terminal and come back and continue. This is frustrating to truck operators who are expecting a more equitable "first-in-first-out" (FIFO) system of service.

- *No priority container "expedition" service*

  There is no set plan for the truck operator who must get the container on the ship or out of the terminal on a high-priority basis. This is sometimes referred to as a "hot-hatch" system.

Many of these problems and opportunities will be addressed, and recommendations will be made, in Chapter 7. Some of the problems identified in this chapter have been eliminated at other terminals, and their solutions will be presented in Chapter 6 in the section titled "Case Studies of Existing Systems."

CHAPTER 5. BARBOURS CUT CONTAINER TERMINAL GATE ANALYSIS

GATE PROCESSING DATA ACQUISITION

In order to perform a procedural analysis, it was necessary to understand the operations at the gate and to collect gate processing information. The information collected took two forms: gaining an understanding of the process and collecting actual gate processing times. The procedural data were outlined in Chapter 3. It is important to note that the data collection procedure (gate times) was not designed to provide statistically significant information. Instead, the methods used are intended merely to provide an indication of general trends. The methods chosen were deemed adequate for the purpose of this research.

Transactions were categorized for the purpose of data collection. This was necessary because of the many different variations of movements truck operators have to perform. Each of these movements has a different processing procedure and, consequently, a different time associated with each movement. The data were collected over a seven-working-day period.

The terminal management as well as the lead personnel with the International Longshoreman's Association (ILA) provided complete access to people for interviews, as well as locations for data collection (times). Three stop watches and a digital wrist watch with a stop watch function were used to collect times. This made it possible to collect four different transactions simultaneously. While this may seem like a simple task, it proved to be very difficult for one person to perform. The data collection would have been greatly enhanced if one person could have tracked one transaction from start to finish rather than track multiple transactions. Allowable resources did not permit this approach. Some transactions took 15, 20, or even as many as 40 minutes, which limited the quantity of data for use in the analysis phase of the research. With only one person timing these transactions, not many datum points could be collected in the allotted time. For example, one difficulty occurred when the person processing paperwork (or the truck operator) wished to explain flaws in the current process while several other timed transactions continued to take place. Several times, when the researcher was able to interrupt the conversation to check on another one of the four simultaneously timed transactions, the truck had already driven off or the paper work had already been sent back in the pneumatic tube or given to the truck operator. This resulted in a lost transaction time or incomplete data point.

There were five data collection areas. Because the terminal already tracks the total truck turn times, it was not necessary to measure the queue times involved in waiting for gate servicing. The data collection focused primarily on actual gate processing. The management at Barbours Cut Container Terminal felt that this information would be helpful in evaluating their system, as they have no way of measuring the actual processing times.

The first data collection was the measurement of delay time experienced by trucks stopping at the entrance gate (see Table 5.1).

The second data collection was a two-part process. Each truck had two times associated with it. These two were (1) total wait time at the main gate and (2) time spent physically on the weigh scale. Total time is the interval from the time when the truck came to a complete stop on the scale to the time when the truck operator could proceed from the gate area after receiving the processed paperwork for the transaction. Time on the scale was a subset of the total wait time. This was the time measured from the moment when a truck stopped on the scale and was inspected by the gate clerk until the truck operator could proceed off the scale to make room for the next truck to be weighed (see Table 5.2).

The third data collection took place inside the main office. The data consisted of times required for paperwork processing. Time started when the pneumatic tube dropped into the office and stopped when the tube was sent back out to the lanes. See Tables 5.3 and 5.4.

The fourth data collection took place inside the Customer Service Booth. Times were collected for handling incorrect or incomplete paperwork (rejects) and also for regular processing of bobtails and chassis movements. As was outlined in Chapter 3, all rejects, bobtails, and empty chassis are processed at the Customer Service Booth (see Table 5.5).

The fifth data collection took place at the main exit lanes. Length of times were measured of truck wait times (queues) for outbound processing, for actual paperwork processing, and for inspection (see Tables 5.6 and 5.7).

FIRST DATA COLLECTION (Entry Gate Delay)

- *Collect delay times experienced by all trucks as they stop to pick up gate passes stamped with time of entry upon arrival at terminal.*

In order to measure delay experienced by trucks which are required to stop at the entrance gate to receive time-stamped gate passes, pilot times had to be collected. This was

TABLE 5.1

Delay Times Measured at Entrance Gate. (in seconds)

Pilot Times 3-17-94				
12	15	10	13	13
average pilot time				
12.6				

Actual Times				
	time	trans.	time	trans.
3/15/94				
	21	chassis	21	bobtail
3/17/94				
1-2pm	21	bobtail	28	load
	20	bobtail	24	chassis
	30	bobtail	20	chassis
	27	chassis	20	bobtail
	18	chassis		
2-3pm	17	chassis	61	chassis
	20	bobtail	45	chassis
	19	bobtail	26	chassis
	20	chassis	26	load
	19	chassis	19	chassis
	15	chassis	22	chassis
	25	chassis	64	chassis
	25	bobtail	25	chassis
	27	chassis	28	load
	23	bobtail	19	chassis
	30	load	25	load
	22	bobtail	17	bobtail
	16	bobtail	17	bobtail
	16	bobtail	23	bobtail
	22	load	19	bobtail
	24	bobtail	24	chassis
	45	load	27	chassis
	20	chassis	31	bobtail
	23	chassis	23	chassis
	28	bobtail	26	chassis

Average time for all transactions
24.96 seconds

Actual Time Summary for Gate Delay

Count	*Mean*	*Min*	*Max*	*Range*
51	25	15	64	49

TABLE 5.2

Port Of Houston Gate Processing Time Analysis (Inbound) Gate Times								
		Scale				Total		
Monday 3/14/94				decimal				decimal
		min	sec	minutes		min	sec	minutes
9 -10am						22	14	22.233
						17	3	17.05
						17	6	17.1
						19	30	19.5
		8	2	8.0333		21	27	21.45
		3	2	3.0333		29	28	29.467
		11	48	11.8		25	7	25.117
		3	3	3.05		8	10	8.1667
		2	56	2.9333		12	30	12.5
10-11am		2	25	2.4167		9	39	9.65
		8	48	8.8				
		7	8	7.1333		18	0	18
		3	3	3.05		12	19	12.317
		6	7	6.1167		43	25	43.417
		5	15	5.25		14	40	14.667
12-1pm						20	40	20.667
		5	10	5.1667		13	40	13.667
		3	15	3.25		22	40	22.667
1-2pm						19	45	19.75
		8	0	8		14	0	14
		3	30	3.5				
		3	45	3.75		37	2	37.033
		3	26	3.4333		9	50	9.8333
						17	41	17.683
		1	20	1.3333		10	6	10.1
		11	58	11.967		17	9	17.15
		4	40	4.6667		14	45	14.75
		4	20	4.3333				
2-3pm		3	48	3.8		15	0	15
		2	35	2.5833		16	45	16.75
		5	45	5.75				
		4	20	4.3333		9	1	9.0167
						15	19	15.317
		5	7	5.1167		21	7	21.117
		2	52	2.8667				
		4	40	4.6667		16	0	16
		7	16	7.2667		14	15	14.25
.2		7	23	7.3833		19	18	19.3

TABLE 5.2 (continued)

3-4pm		12	36	12.6		20	16	20.267	
		11	38	11.633		16	30	16.5	
		11	30	11.5		31	18	31.3	
		12	36	12.6		28	38	28.633	
		4	54	4.9		15	7	15.117	
						16	25	16.417	
						8	25	8.4167	
		11	56	11.933		27	20	27.333	
						23	40	23.667	
		6	48	6.8		13	45	13.75	
		2	50	2.8333		12	18	12.3	
		Scale				Total			
				decimal				decimal	
		min	sec	minutes		min	sec	minutes	
4-5pm		6	35	6.5833					
		8	50	8.8333		14	27	14.45	
		6	5	6.0833					
		10	35	10.583		10	35	10.583	
		3	54	3.9		11	54	11.9	
		Scale				Total			
Tuesday 3/15/94									
7 -8am		28	50	28.833		43	33	43.55	
						29	14	29.233	
		6	28	6.4667		31	50	31.833	
						27	27	27.45	
8 -9am		3	24	3.4		21	12	21.2	
		8	25	8.4167		21	37	21.617	
						6	32	6.5333	wrong gate
		6	39	6.65		14	11	14.183	
Thursday 3/17/94									
7 -8am		8	24	8.4		15	6	15.1	
		7	2	7.0333		35	4	35.067	
		2	52	2.8667		14	40	14.667	
		7	26	7.4333		16	35	16.583	
8 -9am		7	50	7.8333		17	37	17.617	
						23	36	23.6	
						11	47	11.783	
3 -4pm						23	2	23.033	
		11	29	11.483		21	20	21.333	reject
		5	34	5.5667		14	19	14.317	

TABLE 5.3

Office Processing Times (inside)

L-BT = Loaded container in - Bobtail out (single move)
L-BTnb = " " " load is 'In-Bond', requires special attention
L-E = Loaded container in - Empty container out (double move)
E-L = Empty container in - loaded cont. out (dbl. move)
L-L = loaded cont. in - loaded cont. out (dbl. move)
REJ = transaction cancelled - due to incomplete paperwork

Office Processing Times

	In-Bound										
Wednesday			decimal								
3/16/94	min	sec	minutes								
8-9am	3	10	3.166667	L - BT	11-12noon	1	50		1.833333	L - BT	
	3	27	3.45	L - BT		1	38		1.633333	L - BT	
	3	32	3.533333	L - BT		3	38		3.633333	L - BT	
	9	15	9.25	L - BT		6	48		6.8	L - BT	
						10	8		10.13333	L - BT	
9-10am	2	7	2.116667	L - BT		4	12		4.2	L - BT	
	1	54	1.9	L - BT		12	0		12	L -BTnb	
	3	1	3.016667	L - BT		8	33		8.55	L - BT	
	4	50	4.833333	L - BT							
	3	40	3.666667	L - BT	1-2pm	2	36		2.6	REJ	
	4	17	4.283333	L - BT		3	11		3.183333	REJ	
	4	55	4.916667	L - BT		1	46		1.766667	L - BT	
	3	10	3.166667	L - BT		1	36		1.6	L - BT	
	1	51	1.85	L - BT		1	47		1.783333	L - BT	
	7	23	7.383333	L - BT							
	4	0	4	L - BT	2-3pm	4	23		4.383333	REJ	
	6	0	6	L - BT		4	48		4.8	REJ	
	2	59	2.983333	L - BT		3	9		3.15	L-BT	
	3	12	3.2	L - BT		2	45		2.75	L-BT	
	2	42	2.7	L - E		14	38		14.63333	L -BTnb	
						5	0		5	L-BT	
10-11am	2	30	2.5	REJ		2	10		2.166667	L-BT	
	4	42	4.7	REJ		3	10		3.166667	L-BT	
	2	32	2.533333	L - BT		3	20		3.333333	L-BT	
	3	23	3.383333	L - BT		2	26		2.433333	E - L	
	2	46	2.766667	L - BT		3	16		3.266667	E - L	
	4	20	4.333333	L - BT							
	3	0	3	L - BT	3-4pm	1	25		1.416667	REJ	
	8	37	8.616667	L - BTnb		4	0		4	REJ	
	3	20	3.333333	L - BT		7	45		7.75	L-BT	
	2	16	2.266667	L - BT		12	48		12.8	L-BTnb	
	2	25	2.416667	L - BT		2	41		2.683333	L-BT	
	2	47	2.783333	L - BT		4	9		4.15	L-BT	
	4	57	4.95	L - E		5	40		5.666667	L-BT	
	4	3	4.05	L - E		2	14		2.233333	L-BT	
	3	57	3.95	L - L							

TABLE 5.4

Office Processing Times (from outside)

L-BT = Loaded container in - Bobtail out (single move)
L-CH = Loaded container in - bare chassis out
L-E = Loaded container in - Empty container out (double move)
E-L = Empty container in - loaded cont. out (dbl. move)
L-L = loaded cont. in - loaded cont. out (dbl. move)
REJ = transaction cancelled - due to incomplete paperwork

Office Processing Times

In-Bound

Wednesday 3/30/94	min	sec	decimal minutes		Thursday 3/31/94	min	sec	decimal minutes	
1-2pm	7	27	7.45	REJ	3-4pm	6	0	6	L - CH
	6	30	6.5	L - E		4	40	4.6667	L - BT
	6	16	6.2667	REJ		3	10	3.1667	L - BT
						5	20	5.3333	L - BT
						7	25	7.4167	L - BT
2-3pm	8	30	8.5	L - BT		2	50	2.8333	L - BT
	3	30	3.5	L - L		3	15	3.25	L -BT
3-4pm	4	40	4.6667	L - L	4-5pm	2	40	2.6667	L - BT
	4	7	4.1167	L - L		7	2	7.0333	L - BT
	3	38	3.6333	L - L		10	26	10.433	L - BT
						8	11	8.1833	L - CH
						15	15	15.25	L - L

TABLE 5.5

Customer Service Booth Processing Times

B-E = Bobtail in - Empty container out (single move)
B-L = Bobtail in - Loaded container out (single move)
Ch-E = Bare chassis in - Empty container out (single move)
Ch-B = Bare chassis in - Bobtail out (single move)
Ch-L = Bare chassis in - Loaded container out (single move)
REJ = transaction cancelled - due to incomplete paperwork

Customer Svc. Booth Transaction Request (TR) Processing Times

			In-Bound			
Thursday					decimal	
3/31/94		min	sec		minutes	
11-12pm		1	25		1.4167	B - E
		2	22		2.3667	B - L
		2	23		2.3833	B - L
		4	23		4.3833	B - E
		4	8		4.1333	Ch - E
		3	25		3.4167	B - L
		2	24		2.4	B - L
		1	52		1.8667	B - L
		2	27		2.45	REJ
1-2pm		2	1		2.0167	B - L
		1	39		1.65	B - L
		1	10		1.1667	Ch - B
2-3pm		3	50		3.8333	B - L
		4	5		4.0833	REJ
		3	25		3.4167	CH - L

Cust. Svc. Booth ILA TR Checking Times

Thursday				
1-3pm		(in seconds)		
3/31/94				
53	58	48	26	93
30	32	57	40	28
41	65	20	25	36
43	18	115	15	29

TABLE 5.6

Office Processing Times (Timed Inside Office)																	
LOAD = Loaded container out																	
LOADnb = Loaded container out (In-Bond status)																	
Empty = Empty container out																	
REJ = transaction canceled - due to incomplete paperwork																	
			Out-Bound														
Wednesday					decimal										decimal		
3/16/94		min	sec		minutes						min	sec			minutes		
10-11am		0	26		0.4333	Empty			1-2pm		1	20			1.3333	Empty	
		0	36		0.6	Empty					2	8			2.1333	Empty	
		0	21		0.35	Empty					1	1			1.0167	Empty	
		0	48		0.8	Empty					1	20			1.3333	Empty	
		0	22		0.3667	Empty					0	27			0.45	LOAD	
		0	30		0.5	Empty					1	23			1.3833	LOAD	
		0	25		0.4167	Empty					1	20			1.3333	LOAD	
		0	40		0.6667	Empty					1	32			1.5333	LOAD	
		0	30		0.5	LOAD					0	45			0.75	LOAD	
		0	21		0.35	LOAD											
		0	40		0.6667	LOAD			2-3pm		0	27			0.45	Empty	
		0	24		0.4	LOAD					0	20			0.3333	Empty	
		0	28		0.4667	LOAD					0	30			0.5	Empty	
		0	48		0.8	LOAD					0	24			0.4	LOAD	
		0	30		0.5	LOAD					0	40			0.6667	LOAD	
		0	45		0.75	LOAD					0	56			0.9333	LOAD	
		0	27		0.45	LOAD					0	31			0.5167	LOAD	
		0	22		0.3667	LOAD					1	0			1	LOAD	
		0	25		0.4167	LOAD					0	43			0.7167	LOAD	
		1	53		1.8833	LOAD					0	45			0.75	LOADnb	
		1	54		1.9	LOAD											
		0	50		0.8333	LOAD											
		0	39		0.65	REJ			3-4pm		0	30			0.5	Empty	
											1	46			1.7667	Empty	
11-12noon		0	44		0.7333	Empty					0	38			0.6333	Empty	
		0	18		0.3	Empty					0	46			0.7667	LOAD	
		0	33		0.55	Empty					0	46			0.7667	LOAD	
		0	43		0.7167	Empty					0	40			0.6667	LOAD	
		1	6		1.1	LOADnb											
		0	50		0.8333	LOADnb											
		0	52		0.8667	LOAD											
		0	34		0.5667	LOAD											
		0	53		0.8833	LOAD											
		0	36		0.6	LOAD											
		0	35		0.5833	LOAD											
		0	42		0.7	LOAD											
		0	55		0.9167	LOAD											

TABLE 5.7

Outbound Lane Truck Waiting Times (Timed Outside)

L = Loaded container out E = Empty container out

Wednesday

3/30/94

3-4pm

	min	sec	dec. min.		min	sec	dec. min.		min	sec	dec. min.	
Queue Entry	0	0	0	L	0	0	0	L	0	0	0	L
Survey	2	32	2.533		3	40	3.667		1	0	1	
Paper In	7	14	7.233		na		na		na		na	
Paper Out	10	20	10.33		na		na		na		na	
Exit Term.	10	20	10.33		11	36	11.6		4	17	4.283	

	min	sec	dec. min.	
Queue Entry	0	0	0	E
Survey	0	0	0	
Paper In	6	9	6.15	
Paper Out	11	50	11.83	
Exit Term.	11	50	11.83	

4-5pm

	min	sec	dec. min.		min	sec	dec. min.		min	sec	dec. min.	
Queue Entry	0	0	0	L	0	0	0	L	0	0	0	L
Survey	0	18	0.3		0	0	0		0	0	0	
Paper In	1	38	1.633		1	44	1.733		2	46	2.767	
Paper Out	2	57	2.95		3	25	3.417		4	14	4.233	
Exit Term.	4	45	4.75		3	50	3.833		6	12	6.2	

TABLE 5.7 (continued)

	min	sec	dec. min.		min	sec	dec. min.		min	sec	dec. min.	
Queue Entry	na		na	L	0	0	0	L	na		na	L
Survey	na		na		4	9	4.15		na		na	
Paper In	0	0	0		na		0	na	0	0	0	
Paper Out	3	30	3.5		8	42	8.7		1	45	1.75	
Exit Term.	3	50	3.833		9	23	9.383		na		0	na

	min	sec	dec. min.		min	sec	dec. min.	
Queue Entry	0	0	0	L	0	0	0	E
Survey	2	50	2.833		1	40	1.667	
Paper In	5	11	5.183		na		0	na
Paper Out	9	53	9.883		5	35	5.583	
Exit Term.	9	53	9.883		7	15	7.25	

5-6pm

	min	sec	dec. min.		min	sec	dec. min.	
Queue Entry	0	0	0	L	0	0	0	L
Survey	4	5	4.083		2	49	2.817	
Paper In	10	16	10.27		4	35	4.583	
Paper Out	21	28	21.47		8	54	8.9	
Exit Term.	21	28	21.47		8	54	8.9	

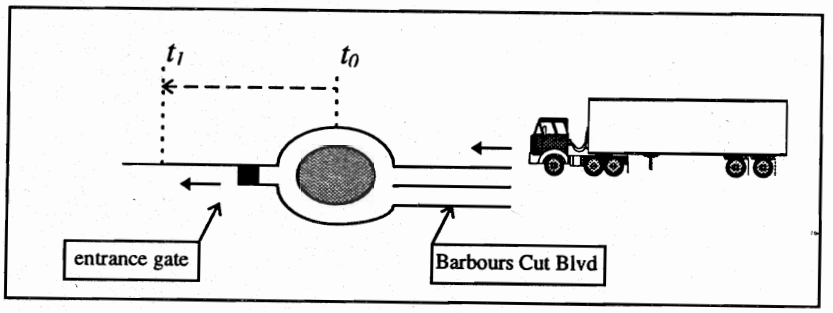


Figure 5.1

done by starting a stop watch when the truck was at a point upstream of the entrance gate and stopping the watch when the truck reached a point downstream of the entrance gate: t_0 to t_1 (see Figure 5.1). Times were collected for five trucks traveling from t_0 to t_1 without stopping (the pilot time). The pilot time average was calculated and the actual times of those trucks (which followed normal procedures) were collected. The usual truck traffic (trucks required to stop at the gate) was unaware of being timed.

The measured delay times are illustrated in Figures 5.2 and 5.3. Figure 5.2 shows the frequencies of the measured times from t_0 to t_1. Figure 5.3 is the actual delay experienced by the current gate entry process. Figure 5.3 times are equal to the values found by subtracting the average pilot time (13 seconds) from each of the recorded times (t_0 to t_1). The outlier delay times in the 30- and 50-second ranges are from truck operators who were unfamiliar with the processing system and had to ask the gate attendant for directions and instructions.

A rough estimate of the delay time encountered at the entry gate can be found by subtracting the average pilot time from the average total delay time. This yields an estimate of 12.4 seconds for the entry gate delay time. Each truck experiences an average of 12 seconds of delay. On the surface, 12 seconds of delay for each truck may seem insignificant; however, the monthly average number of trucks entering Barbours Cut is between 15,000 and 22,000, and when the average monthly delay is calculated, it turns out to be quite significant (50 to 73 hours).

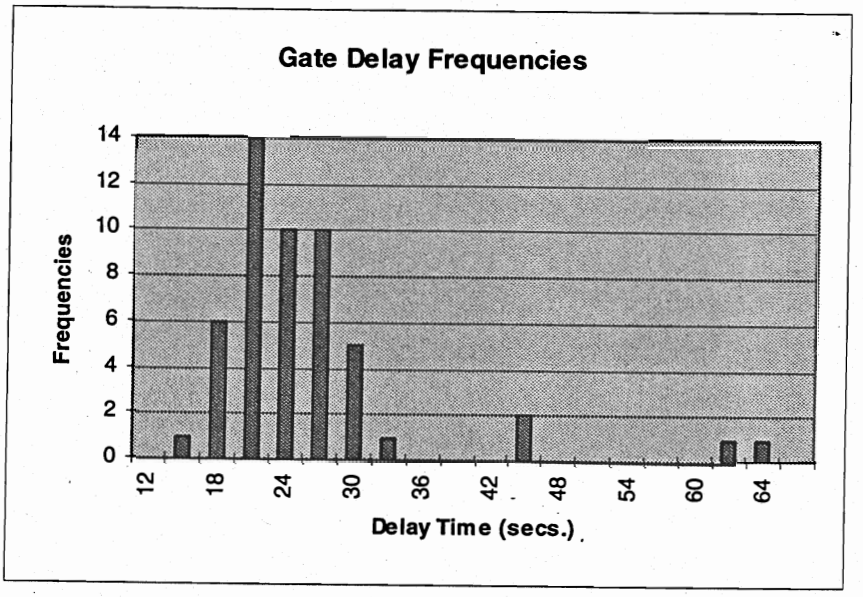


Figure 5.2

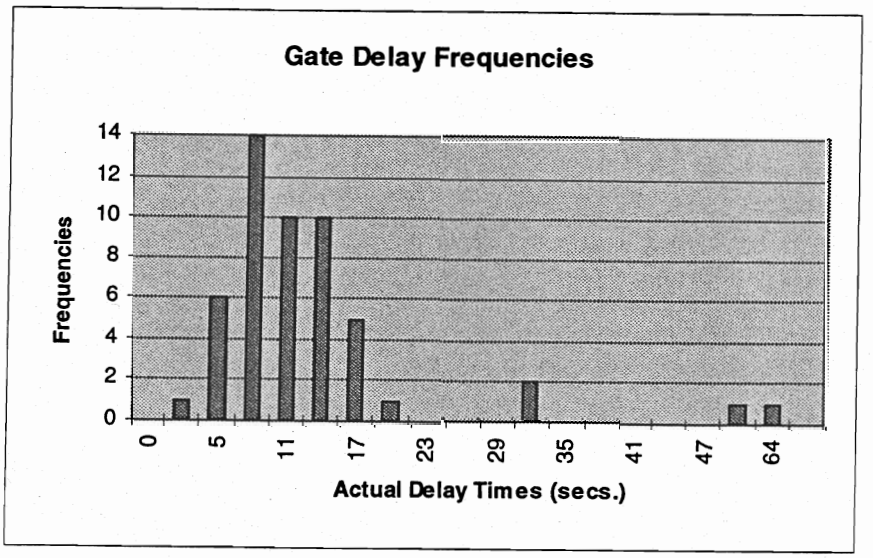


Figure 5.3

SECOND DATA COLLECTION (Main In-Bound Lanes)

- *Collect time on scales and total wait time at the main gate (two-part process).*

Collected times started when trucks came to a complete stop on the weigh scale. The amount of time trucks stayed on the scales was measured, as well as the amount of time that transpired before the truck operators were given their processed paperwork (Figure 5.4 and 5.5).

In-bound Gate Time Summary (Scale)*

Count	Mean	Min	Max	Range
61	6.65	1.33	28.83	27.5

In-bound Gate Time Summary (Total)*

Count	Mean	Min	Max	Range
70	18.87	6.5	43.5	37.0

* Mean, Min, Max and Range values are in minutes.

The number of datum points (Count) in the "scale" time summary does not match the Count in the "total" time summary. This is due to the high amount of activity that occurs at the gate.

Reasons For Variability and Inconsistencies

There is a great deal of variability in the recorded times. This is true for a number of reasons. In one instance, a truck operator's paperwork was processed and sent out to the wrong gate. The truck operator had a total waiting time of over 43 minutes. Some of the more common reasons are as follows:

1. *Container is traveling 'In-Bond'.* This means that additional paperwork (Customs forms, etc.) must accompany the usual transaction request. Processing of In-Bond containers is performed by a designated data entry person. If there is more than one In-Bond container transaction to be processed, then the paperwork for each must sit in a queue in the office until the designated person completes the processing of the In-Bond container which arrived first. In several instances the person processing the In-Bond paperwork had to contact the shipping line by phone. This can be a time-consuming process which can add an additional 3 to 40 minutes.

		Scale				Total			
				decimal				decimal	
Friday 3/18/94		min	sec	minutes		min	sec	minutes	
2 -3pm		7	2	7.0333		16	32	16.533	
		1	58	1.9667		25	0	25	

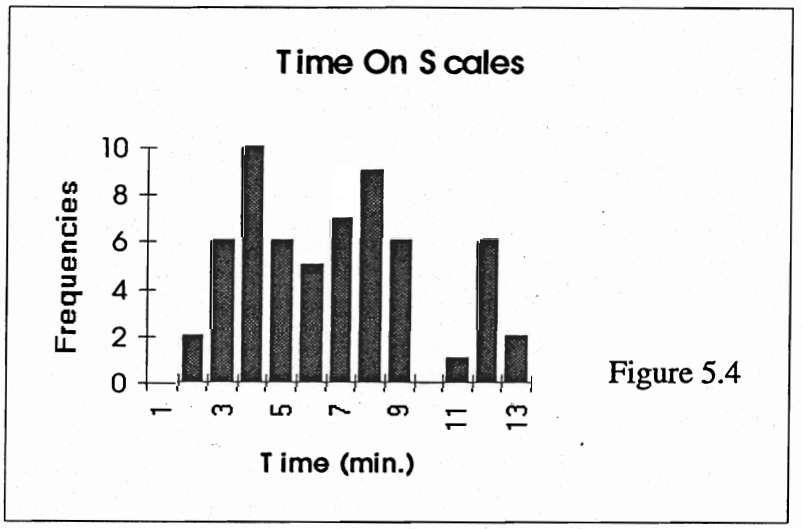


Figure 5.4

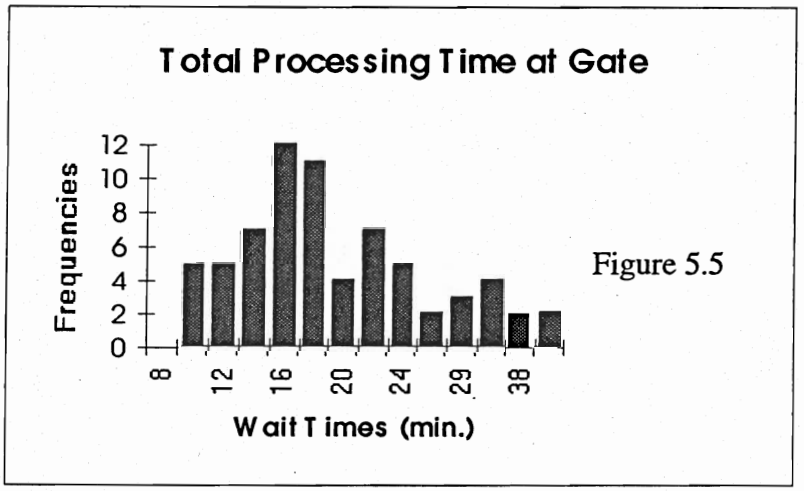


Figure 5.5

2. *The truck driver provided information pertaining to the container is not consistent with the alpha-numeric protocol used by the CONICS system.* Sometimes the booking number provided by the truck operators is missing a prefix digit or the number is off by one digit (requiring the data entry person to search the system). Rather than reject the transaction request and send the truck operator to Customer Service, the data entry person will look for an alpha-numeric string which closely resembles the information provided by the truck operator. To do this, the data entry person tries to find a match to the rest of the information, such as port of discharge, shipping line, shipping date, shipper, etc. This procedure adds to the total gate waiting time for the truck operator.
3. *Lanes are blocked due to lead truck's paperwork processing (waiting trucks must wait for lead truck to move in order to proceed).* Sometimes the trucks form a queue three trucks deep on the outgoing side of each lane. When the truck which is first has a processing problem, then all the subsequent trucks have to wait until the lead truck's problems are resolved.
4. *Because there are no trucks waiting behind the truck being weighed, the driver chooses simply to wait on the scales (in the shade) while the paperwork is being processed.* This occurred only at the end of a working day when gate activity was slow. In such cases the data for the scale time and the total time are identical.
5. *When processed paperwork returns to the lane, the gate clerk is surveying a truck which has just pulled onto the scale.* The truck operators are not permitted to retrieve their own paperwork and must wait for the gate clerk to finish surveying the latest truck (2- to 5-minute process).

In addition to the reasons listed for variability, it is important to note that Barbours Cut Container Terminal also has a flex-time system in place in order to open an hour earlier and to remain open during the lunch hour. This flex-time system requires employees to take lunch hours in shifts. There are seven in-bound gates in service during non-flex hours. The resulting decrease in manpower during those shifts (flex-time) requires that several gates must be closed. During flex-time the number of gates in service may decrease from seven to two, three, or four depending on how many trucks are waiting. While this decreases the number of trucks that can be processed during flex-time and results in longer queues, it does not significantly affect the amount of time per transaction.

THIRD DATA COLLECTION (Main In-Bound Paperwork Processing)

- *Data collected consisted of times for paperwork processing.*

Data collection took place inside the main office. The measurements started when the tubes dropped into the office and stopped when the tubes were sent back to the lanes. The office personnel are not ILA workers. They are Houston Port Authority employees. Because of flex-time at the gates, there are flex hours in the office as well. Generally this works very well, although on several occasions during the seven-day observation period there were inconsistencies. These occurred during the 7 to 8 am shift and the 11 to 12 shift. On one occasion all seven of the in-bound gates were open and servicing trucks, but there were only three or four office persons handling the in-bound load during that time period. There were eight office persons assigned at 8 o'clock.

The first part of the data collection process brings the Heisenberg Uncertainty Principle to mind. In order to understand what takes place in the office and to time that operation, the researcher has to closely observe, analyze, and time each transaction. With the researcher looking over the office worker's shoulder, the worker becomes nervous, slower or faster, and more focused while processing the transaction. All the workers were told that the data collection was in no way any type of evaluation of their individual performances and that processing times would be anonymous. Some employees were concerned about their times and tried to better their previous times. Other employees appeared unaffected, while still other employees felt it necessary to stop mid-transaction and explain what was happening. These explanations proved most enlightening and necessary for the research. Unfortunately, the explanations meant that total processing time for that transaction increased. The only question that each office worker was asked concerning every transaction was what type of transaction was being processed.

The same complications encountered while attempting to track four transactions simultaneously that occurred during total wait time and scale time were also encountered in the office, and times (datum points) were lost.

To counter the effect of having the researcher looking over the office person's shoulder while staff work was being performed, some times were also gathered from the lane booth outside. This was done by starting the watch when the unprocessed paperwork was placed in the pneumatic tube and stopping it when the processed paperwork was returned to the lane booth. Each tube had a color and a number on it so it was not difficult to identify when it returned to the gate. This process took place several days after the office data collection procedure when the office personnel were unaware that they were being timed from the outside (figure 5.6 and 5.7).

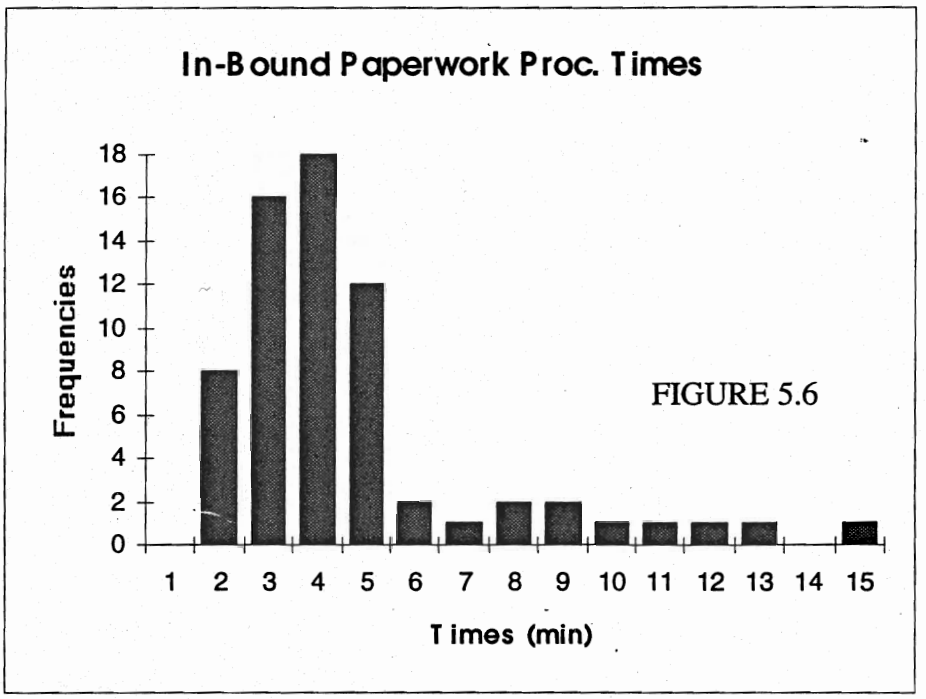


FIGURE 5.6

In Bound Paperwork Proc. Time Summary*

Count	*Mean*	*Min*	*Max*	*Range*
66	4.25	1.42	14.63	13.22

* Mean, Min, Max and Range values are in minutes.

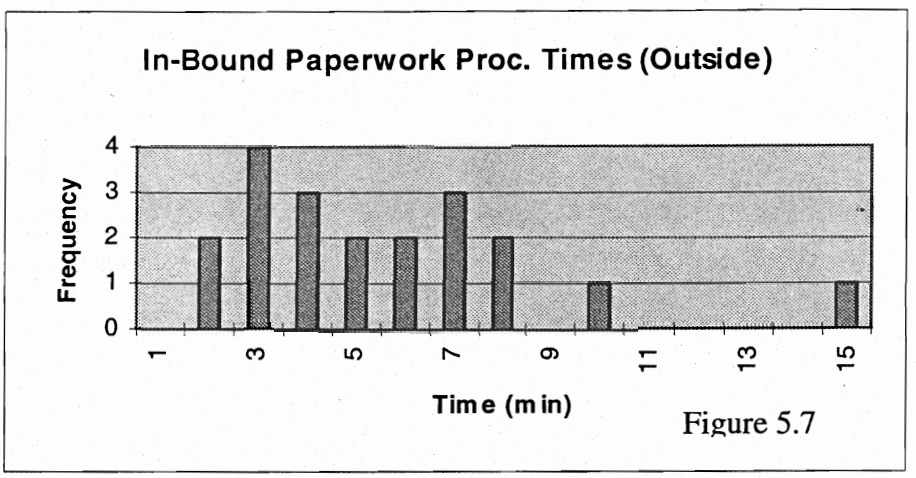


Figure 5.7

In Bound Paperwork Proc. Time (Outside)Summary*

Count	*Mean*	*Min*	*Max*	*Range*
20	6.04	2.67	15.25	12.58

* Mean, Min, Max and Range values are in minutes.

Each truck took an average of 6 minutes on the scales being weighed and surveyed and getting the necessary paperwork completed. It was clear that the remainder of the time was spent waiting for the paperwork inside the office to be processed. The total wait time average for the truck operators is about 19 minutes, and the scale time average is 6 minutes. This means that the paperwork processing should average approximately 13 minutes. The inside times for paperwork processing, instead of averaging 13 minutes, averaged just over 4 minutes. This explains the value of timing the processing of paperwork from outside the office at the lane booths.

The mean times found for office processing times (4 minutes timed inside versus 6 minutes timed outside) did not produce an explanation for the entire 9 minutes that was mentioned earlier. Part of the 9 minutes could, however, be explained by the instances in which the gate clerk is surveying a truck and the processed paperwork has to sit in the booth until the clerk can get back to the booth and hand it to the waiting truck operators.

Reasons For Variability and Inconsistencies

The reasons for the variability in times were very similar to the ones discussed with respect to gate processing data collection - i.e., In-Bond processing delays and incomplete data (not conforming to CONICS protocol). In addition to these reasons, there were instances when a tube dropped into the office for processing but was not noticed. At times, several minutes passed before the tube was noticed and the paperwork processed. This phenomenon was observed only during the reduced staffing involved with flex-time.

FOURTH DATA COLLECTION (Customer Service Booth)

- *Customer Service Booth processing times for all bobtails and chassis movements as well as rejects.*

Data collection took place inside the Customer Service Booth. Times were collected for rejection processing and also for regular processing of bobtails and chassis movements. As outlined in Chapter 3, all rejections and bobtails or empty chassis are processed at the Customer Service Booth.

The Customer Service Booth employs a staff of six people. Two people handle all 'rejects' and are Port Authority of Houston employees; three people process the paperwork for all bobtails and chassis entering the terminal as well as process the corrected "rejects." These three are also employees of the Port Authority. The sixth person checks the Transaction Requests (TR) that the bobtail and chassis drivers must fill out prior to being processed. This person is an ILA worker.

The data collected from the Customer Service Booth includes times required for the ILA worker to check the Transaction Requests, times for the actual processing of the Transaction Requests, and some times associated with correcting "rejects" (figure 5.8 and 5.9).

Customer Service Booth Processing Time Summary*

Count	Mean	Min	Max	Range
15	2.73	1.17	4.38	3.21

* Mean, Min, Max and Range values are in minutes.

ILA Transaction Request Check Time Summary*

Count	Mean	Min	Max	Range
20	43.6	15	115	100

* Mean, Min, Max and Range values are in seconds.

The Customer Service Booth also handles all rejects. Because of the wide range of times associated with correcting reject problems, there was only a small sample of seven data points collected. This sampling occurred between 11 am and 2 pm. Tracking both rejects and paperwork processing was difficult and many data points were lost. The following is a list of those seven data points (times required to correct reject status) and the reasons for those rejects.

1. *Time 35:07 (thirty-five minutes seven seconds)* The reason for this transaction's rejection status was that a loaded container was delivered to the terminal for shipping and was not labeled correctly. The truck operator was unaware that the load he had hauled from New Orleans was classified as Hazardous Material. The truck operator's paperwork stated a different commodity. When the truck operator provided the information required to have his container processed, it was discovered that the container lacked the proper Hazardous Material placarding and the associated paperwork required for hazardous material while in transit. The shipping line had to be contacted and the necessary information was faxed directly to the terminal.
2. *Time 33:00 (thirty-three minutes zero seconds)* The booking number that the truck operator provided was not in the CONICS system. The shipping line was contacted and the correct booking number and information was input into CONICS by the shipping line. When this was done, the paperwork was processed.

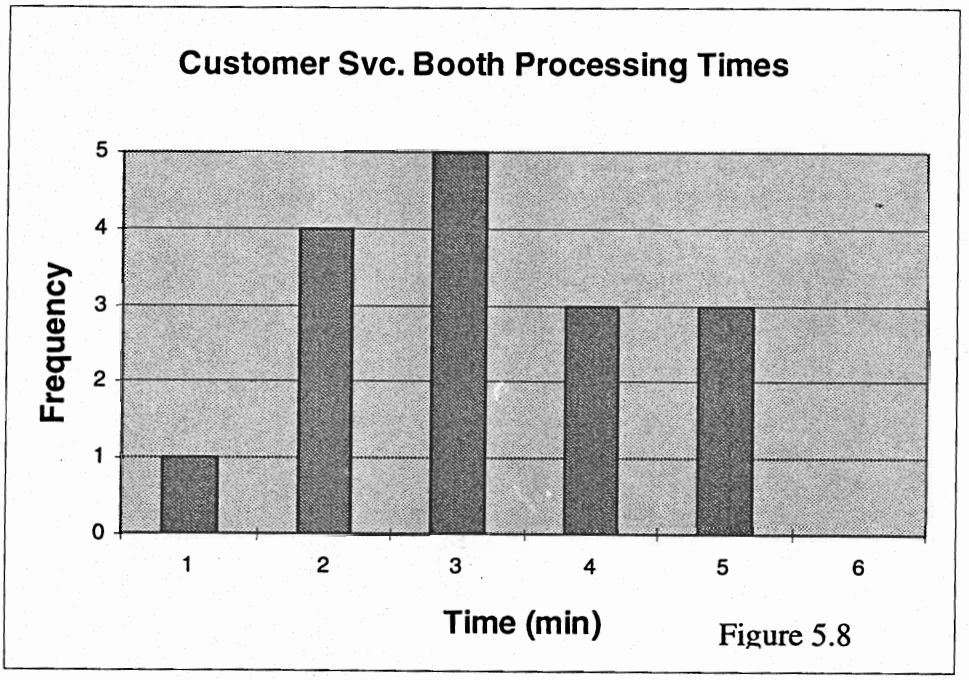


Figure 5.8

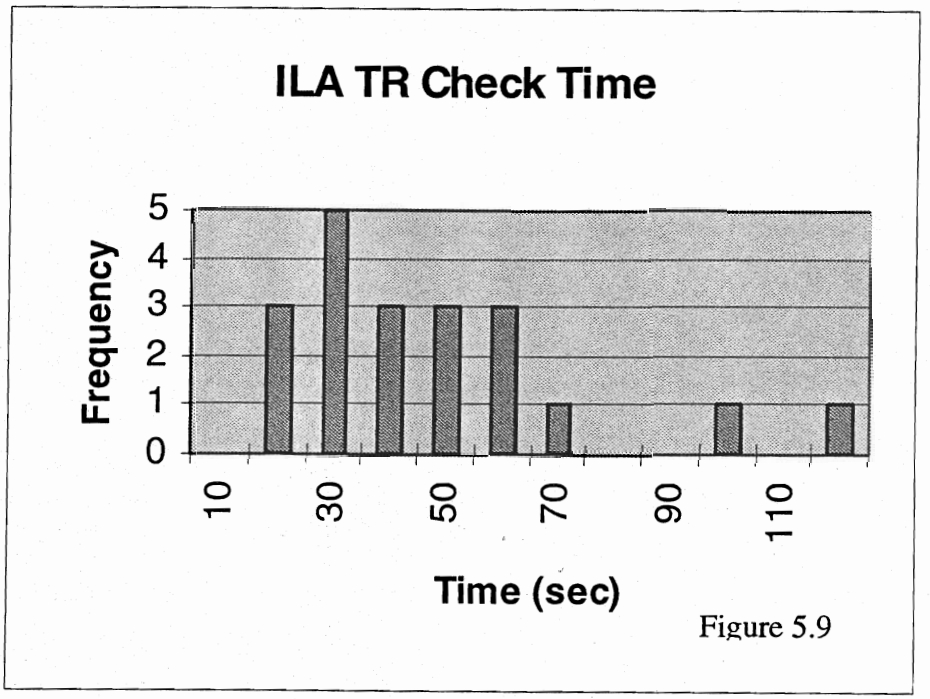


Figure 5.9

3. *Time 10:08 (ten minutes eight seconds)* The shipping line had reserved a specific number of spaces for containers on a particular ship. The truck operator was delivering a container that did not have a reserved space on the ship. The shipping line was notified of its error and it (shipping line) increased the number of spaces on the CONICS system.
4. *Time 1:31 (one minute thirty-one seconds)* Truck operator's information for a container had the wrong Port of Discharge location. This did not match the information on the CONICS system. The shipping line was contacted and the information was verified over the phone.
5. *Time 24:20 (twenty-four minutes twenty seconds)* The imported container load was not yet released by the steamship line. The steamship line was contacted and the reason for non-release was established.
6. *Time 14:15 (fourteen minutes fifteen seconds)* The imported container load was not yet released by the steamship line. The steamship line was contacted and the reason for non-release was established.
7. *Time 2:00 (two minutes zero seconds)* The booking number provided by the truck operator was not in the CONICS system. The steamship line was contacted and it (shipping line) put the correct information into CONICS. After correct information was put on CONICS, the transaction was processed.

Customer Service Booth REJECT Processing Time Summary*

Count	Mean	Min	Max	Range
7	17.19	1.52	35.12	33.6

* Mean, Min, Max and Range values are in minutes.

After each of the rejects was cleared, it was reprocessed right there at the customer service booth instead of requiring the truck operator to proceed back to the main processing gate.

There are several reasons for the rejections that were observed during Customer Service Booth data collection. The reasons are as follows:

- *Booking number not set up for hazardous material*
- *Hold placed on cargo by steamship line*
- *Shipping line needs to increase the number of spaces booked on a ship*

- *Loaded container arrives after ship has sailed; shipping line required to make arrangements (reserve space, booking number, etc.) on next ship*
- *Booking number not on file*
- *Driver has no documentation of any kind*
- *Terminal has no available chassis.; container cannot be delivered until new chassis arrive in terminal*
- *Paperwork indicates different commodity than CONICS system*
- *Truck driver provides paperwork with wrong Port of Discharge*

Barbours Cut Container Terminal currently tracks turn times and categorizes these times as rejects and non-rejects. For the months of January, February, and March of 1994, the terminal had average turn times for non-rejects and rejects as follows:

	January	February	March
Non-Rejects	**18,520**	**17,016**	**22,391**
(Average times)	*(54 min.)*	*(55 min.)*	*(58 min.)*
Rejects	**4,079**	**3,632**	**5,731**
(Average times)	*2 hr. 7 min.)*	*(2 hr. 8 min.)*	*(2 hr. 25 min.)*

It can be seen that the existence of rejects effectively doubles the truck operators' turn times. As was stated earlier in this report, on average, one in every five trucks entering the terminal will encounter a rejection.

Reasons For Variability and Inconsistencies

There was some measure of variability in paperwork processing times. On the day the Customer Service Booth data were collected, two of the three persons processing paperwork were still on "probation" (they had been working for the Port Authority less than six months). The third person had considerably more seniority and could process the paperwork much faster. There is quite a difference in mean paperwork processing times between the customer service booth and inside the office at the main gate (2.73 minutes versus 4.25 minutes). One possible explanation is that the customer service booth is closer to a large group of truck operators and this prompts employees to work faster, while the main office is completely isolated from the lanes and

there is no way of seeing the long lines of trucks outside in the lanes. While this may or may not be true, it was clear that the personnel in the Customer Service Booth appeared to work with a greater sense of urgency.

FIFTH DATA COLLECTION (Main Outbound Lanes)

- *Data collected on outbound lane paperwork processing and waiting times.*

The fifth data collection took place at the main exit lanes. The data were separated into paperwork processing time and truck waiting times. The paperwork processing was timed inside the office and also out at the exit lane booth (from the time the tube went into building until the time the tube returned). When bobtails and bare chassis exit the terminal, they are not required to undergo any type of inspection. The only requirements of bobtails and bare chassis are that they leave through a designated lane and hand the ILA gate clerk the gate pass they received when they entered the terminal. The time required for this transaction is equal to the time required at the entrance gate. The other trucks are required to stop and have their empty containers surveyed or have the seals verifying the integrity of their loaded containers read as they are leaving. The paperwork is sent into the office, where the transaction is put into the CONICS system, and the truck operator is given a copy of the Equipment Interchange Report (EIR). There is generally only one office person solely dedicated to processing the outbound paperwork. The following data involve those trucks exiting with an empty or full container.

Problems similar to those encountered during the in-bound paperwork processing data collection were also encountered during the collection of outbound paperwork processing times. The data entry person for outbound transactions was very aware of the timing process. It was common to hear, "How fast was I that time?" Data were collected on a subsequent day from outside in the exit lanes to develop a more accurate representation of outbound processing times. This was accomplished in a manner similar to what was done for the in-bound paperwork processing.

The following data are at best an illustration of what occurred toward the end of gate operating hours (just prior to the gates closing) on March 30th. The data include events which were somewhat difficult to track for several different trucks simultaneously. The data have several missing times. These times are labeled "na." These data include five different events involving trucks waiting to be processed at the exit lanes as well as whether the container is empty or loaded. The times include the amount of time each truck must wait in the queue at the exit lanes before it is inspected (Survey - Queue Entry), the amount of time it takes for the truck operator's

paperwork to be processed (Paper Out - Paper In), and how long a truck has to wait before it can exit the terminal after the paperwork is processed (Exit Term. - Paper Out). The most significant datum points are the paperwork processing time from outside the office and the total service time (survey to exit).

The afternoon in which this outside outbound data was collected was a very busy day. Some interesting congestion problems develop when there are many trucks with empty or loaded containers attempting to exit at the same time. While the truck operators wait to have their paperwork processed, their trucks form a bottleneck and block the exit. When the exit lanes are very busy, some of the truck operators, after receiving their processed paperwork, have to wait for other trucks to leave in order to have room to exit the terminal (figure 5.10).

Reasons For Variability and Inconsistencies

There is a significant difference between the outbound paperwork processing times that were recorded inside and the times recorded outside. There are several reasons for this disparity. When the times were taken inside the office, there was a different person processing the paperwork than when the times were gathered from the outside. The person timed during inside sampling was attempting to see how quickly the job could be done (self-competition). Truck traffic was relatively light on that particular day. The person who was processing while being timed from outside was not as fast as the first person timed from the inside. Also, this particular day was extremely busy.

The data taken from the outside showed a great deal of variability in total waiting times. It is important to remember that this is a very small sample of the actual traffic that occurred this particular afternoon. The total waiting times varied from 3:50 (three minutes and fifty seconds) to well over 21 minutes. This was a function of traffic "clumping" (e.g., several trucks arriving at the same time, forming a bottleneck at the exit lanes).

COSTS ASSOCIATED WITH CURRENT SYSTEM

Dollar Costs Associated With Current System

Calculating the costs associated with the current gate operations system is done by determining the hourly salaries of the personnel involved with the gate transactions and then multiplying those values by the average times involved with processing each truck. This value is then multiplied by the number of trucks processed during a given period of time. While this is a somewhat rudimentary method, the resulting figures should provide a rough approximation of the actual delay costs.

FIGURE 5.10

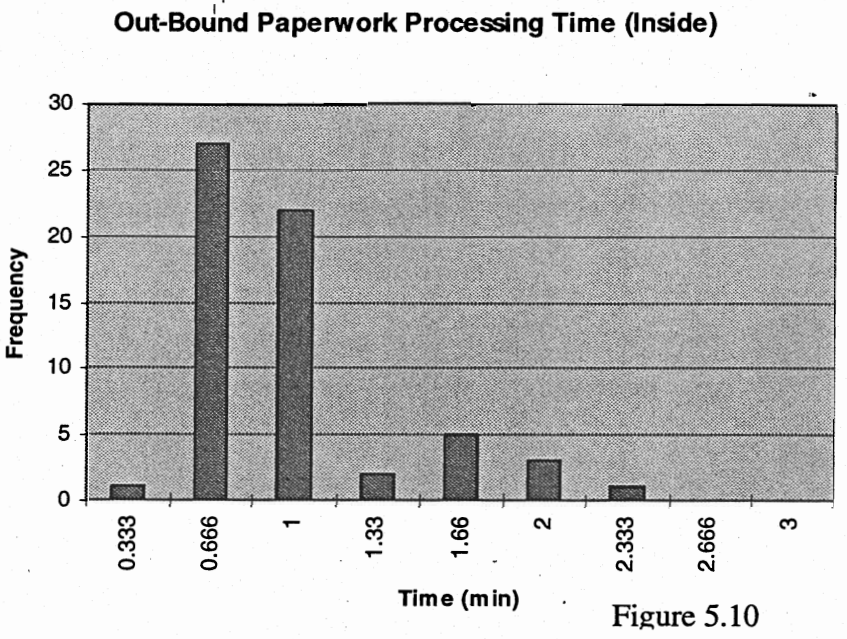


Figure 5.10

Outbound Paperwork Processing Time Summary (Inside)*

Count	*Mean*	*Min*	*Max*	*Range*
61	.77	.3	2.13	1.83

* Mean, Min, Max and Range values are in minutes.

Outbound Paperwork Processing Time Summary (Outside)*

Count	*Mean*	*Min*	*Max*	*Range*
9	3.91	1.31	11.2	9.88

* Mean, Min, Max and Range values are in minutes.

Outbound Gate Time Summary (Outside)*

Count	*Mean*	*Min*	*Max*	*Range*
9	7.22	3.28	17.38	14.1

* Mean, Min, Max and Range values are in minutes.

Labor costs were obtained directly from the terminal management. ILA clerk wages include benefits. With benefits included, the total value provides a more representative estimate of the true cost to the terminal. ILA labor personnel are paid $22.50 per hour. When benefits are included, the total cost to the terminal is $34.89 per hour. During flex-time, the cost for ILA clerks rises to $40.21 per hour; and when overtime work must be performed, the cost rises to $48.20 per hour. For the purposes of this report, the figure of $34.89 (regular hourly cost) will be used.

Office personnel costs could not be officially obtained without permission from the Port Authority Human Resources Department. As a result of time constraints, this data could not be obtained. A very conservative figure of $10.00 per hour will be used for office personnel costs. This figure was chosen on the basis of several conversations with office personnel.

The mean times found will be used to determine the costs associated with processing each truck. Trucks are divided into two categories. The first category is the bobtail or bare chassis which must go to the Customer Service Booth, and the second category is the truck entering the terminal with either a loaded or empty a container.

AGGLOMERATION OF MEAN TIMES

A rough estimate of the delay time encountered at the entry gate can be found by subtracting the average pilot time from the average total delay time. This yields the following equation: 24.96 seconds - 12.6 seconds = 12.4 seconds. Each truck must experience an average of 12 seconds of delay.

Customer Service Booth Processing Time Summary*

Count	Mean	Min	Max	Range
15	2.73	1.17	4.38	3.21

* Mean, Min, Max and Range values are in minutes.

ILA Transaction Request Check Time Summary*

Count	Mean	Min	Max	Range
20	43.6	15	115	100

* Mean, Min, Max and Range values are in minutes.

Customer Service Booth REJECT Processing Time Summary*

Count	Mean	Min	Max	Range
7	17.19	1.52	35.12	33.6

* Mean, Min, Max and Range values are in minutes.

In-Bound Paperwork Proc. Time (Outside) Summary*

Count	Mean	Min	Max	Range
20	6.04	2.67	15.25	12.58

* Mean, Min, Max and Range values are in minutes.

In-Bound Paperwork Proc. Time Summary*

Count	Mean	Min	Max	Range
66	4.25	1.42	14.63	13.22

* Mean, Min, Max and Range values are in minutes.

In-Bound Gate Time Summary*

Count	Mean	Min	Max	Range
61	6.65	1.33	28.83	27.5

* Mean, Min, Max and Range values are in minutes.

In-Bound Gate Time Summary (Total)*

Count	Mean	Min	Max	Range
70	18.87	6.5	43.5	37.0

* Mean, Min, Max and Range values are in minutes.

Outbound Paperwork Processing Time Summary (Inside)*

Count	Mean	Min	Max	Range
61	.77	.3	2.13	1.83

* Mean, Min, Max and Range values are in minutes.

Outbound Paperwork Processing Time Summary (Outside)*

Count	Mean	Min	Max	Range
9	3.91	1.31	11.2	9.88

* Mean, Min, Max and Range values are in minutes.

Outbound Gate Time Summary (Outside)*

Count	Mean	Min	Max	Range
9	7.22	3.28	17.38	14.1

* Mean, Min, Max and Range values are in minutes.

Barbours Cut Container Terminal incurs an estimated $8.00 gate processing cost for every bobtail or bare chassis that enters the terminal. The terminal also incurs an estimated $19.00 gate processing cost for every empty or loaded container that enters the terminal (table 5.8).

During the four-month period from January through April of 1994, there was a total of 77,211 gate transactions at Barbours Cut Container Terminal. This figure of 77,211 transactions includes 36,181 loaded or empty container transactions (main gate processing), 23,717 bobtail or bare chassis transactions (processed at Customer Service Booth), and 17,313 reject transactions (processed at Customer Service Booth or main lanes).

COST PER TRUCK	# OF TRUCKS	TOTAL COST
$8.05	23,717	$191,000
$19.14	36,181	$692,000
TOTAL		$883,000

The above figure of $883,000 for the period of January through April of 1994 does not include the added cost associated with rejects (22 percent of all transactions were rejects). The cost of processing rejects would be considerably higher than that of either of the other two transaction types. In addition to a higher gate processing cost, data indicates that the increase in air emissions from idling trucks and the added congestion resulting from rejected trucks sitting in the terminal an additional hour should be included.

Gate Processing Costs (Bobtail or Bare Chassis)			
	Time (min)	Rate / hr.	TOTAL
ENTRY			
Entry gate	0.20	$ 10.00	$0.03
Cust. Svc. Booth	2.73	10.00	$0.46
ILA Checker	0.75	34.89	$0.44
EXIT			
Gate Svc.	7.22	34.89	$4.20
ILA Paperwork	3.91	34.89	$2.27
Ofc. Processing	3.91	10.00	$0.65
TOTAL	18.72		**$8.05**

Gate Processing Costs (Empty or Loaded Container)			
	Time (min)	Rate / hr.	TOTAL
ENTRY			
Entry gate	0.20	$ 10.00	$0.03
ILA Gate Service	18.87	34.89	$10.97
Ofc. Processing	6.04	10.00	$1.01
EXIT			
Gate Svc.	7.22	34.89	$4.20
ILA Paperwork	3.91	34.89	$2.27
Ofc. Processing	3.91	10.00	$0.65
TOTAL	40.15		**$19.14**

TABLE 5.8

It is important to note that the total times used for estimating costs are not the total waiting times of the trucks during the process. In some transactions there is more than one employee servicing a single truck. An example would be a case in which, while paperwork is inside being processed, the ILA clerk has to remain in the lane until the paperwork is sent back.

Truck Waiting Times Associated With Current System

The waiting/processing time that the truck operator experiences can also be determined using the mean times found earlier.

The mean time the terminal has associated with non-reject turn times is 55 minutes. The 26 minutes spent during gate processing is a significant portion of that 55 minutes. Using some of the current technologies available, the 55-minute turn time can be greatly reduced. The use of these technologies also can reduce the number of rejected transactions. (table 5.9)

Gate Processing Times						
Bobtail or Chassis				**Empty or Loaded Container**		
	Time (min)				Time (min)	
ENTRY				**ENTRY**		
Entry gate		0.20		Entry gate		0.20
Cust. Svc. Booth		2.73		ILA Gate Service		18.87
ILA Checker		0.75				
EXIT				**EXIT**		
Gate Svc.		7.22		Gate Svc.		7.22
TOTAL		**10.90**		***TOTAL***		**26.29**

TABLE 5.9

The costs identified do not include the waiting time (between transactions) encountered by each truck operator or the cost of office personnel and gate clerks having to redo their jobs because of rejects. The figures should be used to compare the cost of current operating procedures with the cost of a more efficient system. Sometimes a newer alternative system can be rejected because of a seemingly high total cost. Unfortunately, that rejection is sometimes made without realizing the costs associated with continuing to operate under current conditions. The times and dollar figures estimated in this chapter should be used when determining the feasibility of the alternative system detailed in Chapter 7.

Chapter 6. ITS CVO Technology at Marine Container Ports/Terminals

In applying information technologies to traffic and cargo management, U.S. ports in general lag behind the most sophisticated ports in Europe and Asia. These ports are already investing in the software, computer links, fiber optic networks, and mobile radio terminals that will allow the terminal managers to better control inventories and manage the flow of containers....(excerpt from TRB Special Report 238 "Landside Access To U.S. Ports")

TECHNOLOGICAL ADVANTAGE REQUIRES TEAM CONCEPT

In the majority of the terminals investigated for this report there was autonomous behavior to some extent. This autonomy is not unique to the marine container industry. Unfortunately, in order to implement advanced technologies that will affect several organizations, autonomy can lead to institutional issues which are difficult to overcome. With autonomy comes strong self-serving interests. When these self-serving interests shut out the ability to compromise and work as a team, battles can develop within the system. Too often these are the types of battles that are fought when ideas are introduced involving the implementation of new technology in order to increase productivity and efficiency levels. With respect to U.S. ports, the opposing teams represented above have many names. Quite often these autonomous entities have names like terminal management, labor unions, the port authority leadership, the shipping lines, and the trucking companies. Unfortunately, these types of battles cannot produce a victor. Opposition and a non-team effort will result in disaster no matter who "wins" the battle. In the case of marine ports, these battles can lead to a loss of business for that particular port or terminal. Some shipping lines find that they can better serve their customers by relocating their ports of entry. They find that, even with the added expense of using a port which is farther away from their customer (in some cases the new port is cheaper due to a lack of higher labor wages or required Guaranteed Annual Income payments), the new port has a more efficient system and can provide a more seamless service.

Terminals like the Port of Baltimore's Seagirt Marine Terminal have found that the team concept has made their terminal much more attractive to shipping lines. Simply put, the team concept is a method of planning and implementation which includes representatives from the various organizations involved. These terminals have realized that by using the team concept with management and labor, both parties become active stakeholders in their advanced technology-

based system. This concept has allowed Seagirt to reach productivity levels exceeding their competitors' by providing a service which is more sensitive to all of its customers, not just the shipping lines but the trucking companies as well.

In order to implement these Intelligent Transportation Systems (ITS) technologies in the marine port environment, it is necessary to understand the "Institutional Issues" involved. A 1992 report explains that in order to implement advanced technologies in the work place, there are two aspects which must be understood: the technology deployed, and the organizational context where deployment will take place. In this 1992 report by Gifford et al., the authors cite an excerpt from Tornatzky to demonstrate their point:

> *...one [of] the authors [observed] the introduction of a machine vision system in a large auto assembly plant. The technology was apparently introduced into the manufacturing plant as the result of almost purely technical interest on the part of staff at the corporate engineering center. Corporate engineering staff members were excited about the new technology and wanted to see what it could do on the plant floor. Plant personnel were almost totally uninvolved in decisions both about the technology itself or how it would be used. The result was a system to which almost no one on the plant floor paid much attention. Consequently, it had little or no impact on the manufacturing process.*

Gifford et al. go on to say:

> *Indeed, a key concept in current technological theory is that during the implementation of technologies there is "mutual adaptation" between the technology and the context in which it is being implemented. That is, while a technology is being implemented, there is a reflexive process by which both the technology changes to adapt to local circumstances, the local organizations change to adapt to the constraints of the technology. The capability for producing or creating this mutual change or "reflexive adaptation" is critical to the successful adoption of the technology.*

This passage expresses the ideas of being flexible regarding change and also of utilizing a team concept to make those changes. The team concept should not be implemented in the deployment phase. The team concept should be used during the conceptual phase. This process can eliminate any potential battles which can occur. Failure to utilize this team concept method could result in costly systems being put into place which would not be utilized to their full potential (wasted resources), or battles which could result in a loss of shipping business. In the latter case all parties concerned stand to lose.

TECHNOLOGIES APPLICABLE TO MARINE PORTS

There are several ITS technologies available today which are currently in use in marine-port related Commercial Vehicle Operations (CVO) applications. The technologies which follow have been tested and are operational in these and other applications. Many ITS technologies have remarkable transferability qualities and certainly can be used at marine container terminals to increase efficiency and productivity of both the commercial vehicle operators serving the port community and the individual terminals themselves. This list includes, but is not limited, to:

- Automatic Vehicle Identification (AVI)
- Automatic Equipment Identification (AEI)
- Weigh-in-Motion (WIM)
- Electronic Placarding/Bill of Lading (EBL)
- Automatic Vehicle Location (AVL)
- On-Board Computers (OBC)
- Two-Way Real-Time Communication
- Electronic Data Interchange (EDI)
- Closed Circuit Surveillance/Video System (CCTV)
- Facsimile Machines (FAX)
- Radio Frequency Identification (RFID)
- Truck Operator Identification Cards (Smart Cards)
  - Bar Coding
  - Magnetic Striping
- Port Based Highway Advisory Radio (HAR)
- Leaky Cable (for real-time traffic information dissemination)
- Variable Message Signing
- Port Based CVO Inclusion In Existing Advanced Traffic Management System (ATMS)

The applications of many of these technologies are shown in section 6.4 titled "Case Studies of Existing Systems."

BENEFITS OF ITS CVO TECHNOLOGY

The benefits realized by that portion of the CVO community using these ITS technologies were put quite aptly in the Midwest Transportation Center's February, 1992 report titled "Intelligent Vehicle-Highway Systems - Institutional Barriers and Opportunities for I.V.H.S. in

Commercial Vehicle Operations: An Iowa Case Study." The authors listed the anticipated benefits as follows:

1) Reduced Congestion and Shipment Delays
2) Accident Reduction, Highway Safety
3) Improved Truck Operator Performance
4) Improved Carrier Management Information
5) Greater Energy Savings
6) Improved Intermodal and International Traffic
7) Improved Ambient Air Quality
8) Increased Infrastructure Capacity
9) Reduced Compliance Costs for Motor Carriers

Many of these benefits are explored in the section titled "Case Studies of Existing Systems."

As technologies continue to advance, the number of varied applications of those technologies to solve today's problems continues to grow. The marine container port arena is certainly no exception. The following Case Studies section will illustrate how ITS technology is being used at some ports and terminals today.

CASE STUDIES OF EXISTING SYSTEMS

These case studies will give characteristics of the port and/or terminal and briefly explain some uses of ITS CVO technology in operation at that location. Most operations involved in this case study section were chosen because they were cited as "pioneers" in the usage of technology to increase trucking efficiencies and productivity. These recommendations were made by staff at the American Association of Port Authorities (AAPA), by various port authority personnel, and by shipping line management personnel.

The Port Authority Of New York & New Jersey

The Port Authority of New York and New Jersey is a landlord port. The Port Authority is very diverse in its respective businesses. It is actively involved with the port, public transit, aviation and the roadway system.

The Port Authority of New York and New Jersey is an active member of TRANSCOM (Transportation Operations Coordinating Committee), which is a coalition of transportation and traffic enforcement agencies in the New York/New Jersey region. TRANSCOM's Operations Information Center (OIC) monitors the levels of service of 38 limited access highways consisting of over 6,000 lane miles and 19 tunnels and bridges located in the Port Authority's 500-square mile

network area. TRANSCOM is informed and, in turn, provides information on any scheduled roadway, bridge, or tunnel maintenance which could possibly affect traffic operations. In addition to providing this weekly faxed report to member organizations, it also provides real-time traffic information via an alpha-numeric beeper system. The minute OIC is notified of an incident affecting traffic patterns by any of its member agencies, it immediately alerts all other members who could possibly be impacted by means of beeper. According to TRANSCOM's American Trucking Association (ATA) sponsored report titled "The Utility of Real-Time Traffic Information in Trucking Operations," TRANSCOM operates on a 24-hour basis with over 100 different highway, police and transit agencies, as well as the traffic reporting services that serve radio and television, participating in the network. TRANSCOM has experimented with "leaky" cable as a means of transmitting real-time traffic data but did not have much success. In an area as dense as the New York metropolitan area, many trucking companies are faced with the realization that, for many of their destinations, their route choice selection is limited to one. If there is an incident along that route, then they just have to sit and wait it out. With this knowledge in hand, they are not as inclined to subscribe to TRANSCOM's service of providing real-time information which could be used for rerouting.

The Port Authority of New York and New Jersey is responsible for the implementation of the service Automated Cargo Expediting System (ACES, a General Electric communications product). ACES is a large-scale electronic mail system which can be used by other ports throughout the country. It can also be used by shipping companies, brokers, forwarders, customers, terminals, trucking companies, and Customs agencies. This system uses Electronic Data Interchange (EDI) to ship manifests and other cargo-related information through the ACES communication conduit. Trucking companies are able to find out when and how many containers will arrive in port, days in advance of actual arrival. The sender of the information is charged a utilization fee of $0.25 per 1,000 characters. The Port Authority of New York and New Jersey is pursuing a relationship with a similar European operation in order for a global cargo expediting electronic mail network to be realized.

Another innovative idea which the Port Authority of New York and New Jersey is implementing is the issuance of "smart cards" to truck operators. Existing systems at container terminals in the New York and New Jersey area are developing truck operator identification systems which are non-compatible with those of other terminals. The new Port Authority of New York and New Jersey system will have the truck operator's photo, and social security number, as well as the trucking companies represented and their respective SCAC codes. These cards will

have the truck operator's unique identification encoded on the ID cards in two methods, bar-code and magnetic stripe. The reason for this dual type of coding is that the terminals' existing systems require bar-coding at some terminals and magnetic striping at other terminals. The Port Authority of New York and New Jersey decided to use both methods in order to reduce individual terminal costs.

The ID cards issues by the Port Authority will access the truck operator's file and indicate under which trucking companies the operator is authorized to operate. There will be an initial charge to each trucking company of $10.00 for each truck operator to whom it wants issued ID cards. Each time a trucking company wishes to add or drop a truck operator's name from its authorized list, the company is required to pay an administrative charge to the Port Authority of New York and New Jersey for each update.

This ID concept will not eliminate the need for paperwork involved with container movements, but it will eliminate the need for manual checks of trucking company records or any checks involving truck operators. This system, which was designed with the help of various container terminal personnel, will be a tremendous help to trucking companies who must constantly contend with updating each terminal at which owner-operated truck operators are authorized to pick up or deliver containers for their company.

Sea-Land Terminal - Elizabeth, NJ

Acreage: 250
Operation Type: Wheeled
Labor Union
Longshoreman: ILA
Ofc. Personnel: OPIU
Container Mvmts. / Month: ~ 33,000
No. of Gates: 20 (entry and exit)
Terminal Opr.: Sea-Land Service, Inc.

The Sea-Land terminal facility serves its own shipping line as well as other shipping lines. The top five commodities going through this terminal are 1) military freight, 2) beer and liquor, 3) consolidated freight, 4) food stuffs, and 5) waste paper and waste cloth. The facility also moves such goods as automobiles, finished pieced goods (such as clothing) and chemicals and chemical products. These cargoes can undergo inspections from the U.S. Department of Agriculture, U.S. Customs, U.S. Fish and Wildlife Service, DEA, FBI, INS, and state and local police.

During the period July 19, 1993 through August 15, 1993 (a typical 20-day working period), Sea-Land experienced the following gate moves:

Entering Terminal

7,639 empty containers
8,509 loaded containers
Total 16,148 containers

Exiting Terminal

5,648 empty containers
11,208 loaded containers
Total 16,856 containers

Sea-Land personnel encounter bobtails (tractor with no trailer or chassis) approximately 30 percent of the time. This means that with 16,148 containers entering the terminal, approximately 4,844 bobtails left the terminal. Likewise, with 16,856 containers leaving the terminal, approximately 5,057 bobtails entered the terminal. During this period (one month), Sea-Land had a total of 33,004 container gate moves with a daily average of 1,650 gate moves. That daily average breaks down to 807 containers entering the terminal (382 empty, 425 loaded), and 843 containers leaving the terminal (282 empty, 561 loaded). The terminal served ten individual shipping lines during this particular month.

Sea-Land personnel reported that there are approximately 6,000 trucking companies serving the terminal. Of the trucks serving the port, approximately 90 percent are owner-operated, and approximately 85 percent make short-haul deliveries (defined as a delivery within a 100 mile radius of the terminal).

According to the Cargo Operations Manager, the largest complaint truck operators have at this terminal is similar to complaints heard at other terminals involved in this report: waiting times experienced at entrance and exit gates are excessive. In some cases trucks must wait an average of 45 minutes before they are able to reach the entrance gate. The current system requires an additional 4 to 10 minutes for a truck operator to be processed after reaching the entrance gate attendant. Sea-Land personnel, recognizing these long waiting times for truck operators to get processed, have been instrumental with the Port Authority of New York and New Jersey in developing the new standardized truck operator identification cards.

Total turn-around time for truck operators after passing the entrance gate is close to the average found at the other terminals involved with this report. These times average around 50 minutes to one hour. However, with constant improvements under Sea-Land's employee empowering Quality Management system, these times continue to decrease.

Some of the internal paperwork procedures are automated, but, due to existing labor contracts, Sea-Land is required to complete the forms by hand. For the purpose of this study, the two technological advancements Sea-Land has in operation are closed circuit television (CCTV) cameras and a container inquiry system utilizing fax technology. The CCTV cameras are directed at the entrance and exit gates. The terminal gate manager can observe when a backlog of trucks begins to develop and can open more gates for either entry or exit purposes. Trucking companies are able to use fax machines to request container status information. The current system limits the amount of information to 10 containers and the information must be requested between the hours of 7 a.m. and 8 a.m. on weekdays (before terminal gates open).

Sea-Land is trying new and innovative ideas to increase its productivity through ideas like creating disincentives for truck operators to "mispark" containers in the terminal yard, pre-inspecting chassis so that truck operators can avoid the lines through the roadability check station, and other non-technical smart ideas. Sea-Land realizes that its operations in other parts of the world are becoming more productive and remaining more competitive with the use of automation. Sea-Land also realizes that labor relations are a very important aspect of the shipping business and that they must work within their constraints to make improvements which will be beneficial to all concerned.

Some office personnel interviewed were able to recall the history of Sea-Land's Port Elizabeth operations when a loaded ship took 10 days and 200 dock workers to unload — then it took 2 days and 70 dock workers, then 1 day and 70 dock workers. This is, of course, due in large part to the advent of containerization.

Maher Terminals-Port Newark/Elizabeth Marine Terminal Complex

Acreage: 550

Operation Type: Wheeled and Grounded (2 terminals)

Labor Union

Longshoreman: ILA

Ofc. Personnel: None

Container Mvmts. / Month: ~ 65,000

No. of Gates: 40 (entry and exit)

Terminal Opr.: Maher Terminals

Maher Terminals is one of the more technologically advanced terminals involved in this study. It has incorporated Automatic Equipment Identification (AEI), Radio Frequency Identification (RFID), and bar-coded truck operator identification cards to allow for a reduction of in-terminal dwell time for truck operators. Maher Terminals has approximately 4,500 active trucking companies serving its terminals.

Maher's Express Card is a photo identification (ID) card which works much like the new card the Port Authority of New York and New Jersey will issue. This ID system speeds up the full container delivery process, offers positive truck operator identification, and allows for quicker exit of terminal by presenting this Express Card to the outbound guard for validation prior to exiting the facility. Maher has issued approximately 4,200 Express Cards to truck operators representing approximately 3,000 trucking companies.

Another feature Maher offers its customers (trucking companies included) is 24-hour container availability information. Using a touch-tone phone, a trucking company dispatcher or the truck operator can call the special Maher Terminals phone number, enter their unique Maher Terminals ID Code, enter the abbreviated six-digit container number and be advised of the status of the requested container.

Maher offers its trucking companies the option of purchasing, for $40.00, an AMTECH transponder to be mounted on the front fender of each truck. The transponder readers are located at a terminal entry point far in advance of the service lanes. Prior to the usage of AEI technology, there was no way of measuring the sometimes long delays incurred by each truck operator prior to being serviced. Since it was not feasible to measure the delay at that time, it was not possible to include waiting time in total in-terminal dwell time estimates. With the inclusion of AEI, the terminal operator can identify where delays are within the system and, consequently, how to reduce those delays. The terminal operator is also capable of identifying false delay claims made against the terminal. When the AEI-equipped trucks leave the terminal, they are given a printout which identifies the movements made by the truck within the terminal and the total time involved. According to Maher personnel, this system has identified some delay areas within the system which have resulted in paying time limit fines to trucking companies. However, management feels that the advantages that come with a better understanding of their system through usage of AEI far outweigh any penalties.

Another innovative system which Maher Terminals has in operation involves the usage of Motorola's Radio Frequency Identification (RFID) system. Maher has mounted RFID equipment on in-terminal jeeps (used for locating containers), straddlers and top loaders. This system benefits truck operators in many ways. As the container is parked in the terminal, the in-terminal jeeps locate and verify containers by entering the container numbers in a mobile RFID unit which is tied directly into the mainframe computer. This allows for real-time updates of information. This system is also helpful when a truck is picking up a container. The truck operator approaches a booth in the terminal and hands the slip of paper received from the entry service lane to the booth attendant. This booth attendant punches in the container information and instructs the truck operator to park in a designated space. This information, which was entered into the mainframe, is transmitted via radio frequency to the straddle carrier. A video display in the straddle carrier informs the operator where the container is to be parked or mounted. The straddle carrier's monitor has information on several containers which have to be loaded. This "assignment list" is displayed on the monitor in the order of truck arrival. If a truck has been waiting longer than a certain period of time, then this assignment flashes and becomes a priority assignment. Generally, two or three straddlers are operating simultaneously. The ILA workers, as well as the truck operators, are very pleased with this system and claim phenomenal reductions in service times.

An important note to add to Maher Terminals' case study is that as of July, 1993, labor union contracts allow Equipment Interchange Reports (EIRs) to be electronically produced at one of their terminals, while the other terminal, which is only about a mile away, is required to have the EIRs filled out by hand. Again it can be seen that labor relations can influence a terminal's level of service.

Seagirt Marine Terminal - Baltimore, Maryland

Acreage: 220

Operation Type: Wheeled and Grounded

Labor Union

Longshoreman: ILA

Ofc. Personnel: None

Container Mvmts. / Month: ~ 25,000

No. of Gates: 9

Terminal Opr.: Port of Baltimore/Maryland Port Administration

Seagirt Marine Terminal is the most progressively designed terminal studied in this report. The terminal is four years old and was built at a cost of approximately $250 million. The terminal uses many of the ITS CVO technologies listed earlier in this chapter. Seagirt is the only marine terminal involved in the study which utilizes a variable message signing system for entering trucks. The variable message sign is a dynamic system for directing truck traffic to appropriate lanes for given conditions.

There are approximately 3,500 trucking companies serving the Seagirt terminal. This terminal moves approximately 10 percent of its containers by rail. The ship-rail portion of this intermodal operation does not involve the use of trucks. The straddlers are used to pick up the containers at shipside and load them directly onto railcars.

The terminal personnel claim to have the capacity to move approximately 1000 containers per day with the current system. At the time of the field visit, the terminal management and labor team had plans for a closed-circuit television (CCTV) system to improve their gate operations. Their current system requires each truck operator to pull into a designated lane (some of the lanes have weighing scales), pick up the telephone handset (mounted at truck operator window level), and give the data entry clerk (sitting above and in front of the incoming lanes) the necessary information over the phone. If the truck operator is bringing in a loaded container, then the truck operator is in the lane with a scale, and the truck weight is automatically entered, along with the transaction information. When the data entry personnel print the equipment interchange reports, they tell the truck operators to pull forward to a designated lane and pick up their EIRs and instructions as to where to park or pick up their containers. The terminal management and staff are very proud of their system for trucks that do not have the appropriate information or cannot read the information off their paperwork. When trucks pull up on the scales and a problem is identified by the data entry clerks, then the clerks merely press the "F2" key on their keyboard and the weight is printed on an EIR; the truck operators are then told to pick up their EIRs and proceed to the customer service area. This system reduces congestion and, consequently, delay.

Labor personnel who worked at the Port of Baltimore prior to the new Seagirt Terminal claim that truck turn time averages have dropped from one hour to 15 minutes. They also claim that truck turn times for double moves are averaging 25 minutes. It is important to note that these times are for the containers which are already mounted on chassis (wheeled operations).

The personnel (gate clerks and Maryland Port Administration staff) present at the terminal stated that the reason for their success is the use of the team concept from the planning stages of the container terminal. Conversations with the labor personnel convey a definite stakeholders'

pride in the terminal's advanced systems. Walt Benewicz, one of the lead people on-site with the ILA, stated that he felt that education of the ILA is the key. He went on to say that the Maryland Port Administration sends the ILA personnel to college level classes as well as technical training classes at the local colleges. Not only were ILA personnel on hand when the system was designed, they are constantly being educated on how to operate and update it. Seagirt's success is being noticed by the shipping lines also. Seagirt is overcoming what is probably its primary drawback. That drawback is that the terminal's distance from open sea forces ships to take what is referred to in Gerhardt's *"Intermodal Freight Transportation"* as the "Chesapeake Cruise."

The Port Authority Of New Orleans

The Port Authority of New Orleans is a good example of a landlord port that takes an active role in helping its customers (terminal operators, brokers, shippers, trucking companies, etc.) prosper in their respective lines of business. For the purposes of this report, that help comes in the form of a service called "Crescent."

The Crescent program offers the ability to transfer data (via EDI) between all the entities involved in the shipping industry. These entities include shipping companies, forwarders, brokers, terminal operations, trucking companies, customs agencies, and most other interested parties. The Crescent system is not like the Port of New York/New Jersey's ACES system. ACES is merely a conduit for customers to send whatever information they wish from point A to point B. Crescent, however, is much like a large database and uses ACES to send its information. Not only can Crescent transfer the data, it can deliver the data in any format previously agreed upon between Crescent and the sender. In many ports throughout the country, most shipping companies and terminals require the usage of their personalized forms. This has proved to be a burden on many trucking companies that serve more than one terminal. With the Port of New Orleans' Crescent program, data can be entered in a menu-type format and printed at various destinations in whatever format the end-users require. In some cases this system has led to the elimination of some of the import cargo release papers, which had to be produced by the truck operator.

The Crescent service is offered to trucking companies serving the port at no charge. Trucking companies must register with the Port of New Orleans in order to be included in the Crescent computer system. Basically, this registration consists of providing a FAX number, company name and address, and other basic information. Once registered, a trucking company can use a personal computer and dial into the Crescent computer to access pertinent information

such as container clearance status. This capability eliminates the costly problem of dispatching a truck operator to a terminal to pick up a container which has not been cleared for release.

By utilizing the services that the Port of New Orleans offers through the Crescent computers, a broker is able to send pertinent customs information to the U.S. Customs office in Franconia, Virginia, and gain a cargo release up to 48 to 72 hours prior to the ship's arrival at the Port of New Orleans. After an import release is gained, the steamship line uses Crescent to send the terminal the appropriate release papers. If the trucking company is registered, the Crescent computer will automatically fax a copy of the release to the trucking company at the same time as the terminal is notified of the release.

Some steamship lines pre-enter important export data via Crescent before the truck operator arrives at the terminal with the loaded container, thus assuring that the truck operator is not caused unnecessary delays due to lack of critical information.

The Crescent system, while very innovative and efficient, did not gain immediate, widespread acceptance. Its acceptance is steadily growing today because the potential users are being convinced of the benefits to their individual operations.

N.O.M.C., Inc. Terminal - New Orleans, Louisiana

Acreage: 69

Operation Type: Wheeled and Grounded

Labor Union

Longshoreman: ILA

Ofc. Personnel: N/A

Container Mvmts. / Month: ~ 5,000

No. of Gates: 9

Terminal Opr.: N.O.M.C., Inc.

The computer operations at New Orleans Marine Contractors, Inc. (N.O.M.C., Inc.) and the Port of New Orleans' Crescent computer system are closely tied together. This relationship allows N.O.M.C. to offer its customers services which are state of the art. N.O.M.C. has come up with very innovative ways to help service its trucking company customers. The following paragraphs will briefly outline some of those services.

Each of the terminal's shipping customers uses Crescent to send import releases to the terminal. With this ability comes the option for the shipping line to choose a paperless release, which allows truck operators to pick up import cargo by giving the terminal gate attendant a password. Some shipping companies give a password to a trucking company, which will allow only

one container pickup for that password (which may be simply a color or a bill of lading number or anything else the shipping company chooses). In some cases the password is a 'blanket' password for all of the containers a trucking company has been assigned to pick up. In almost all cases the shipping company will assign different passwords to different trucking companies. If the cargo is excessively sensitive or valuable, then each container will have its own password. With the password, all the truck operator needs to make a pickup is the steamship line name, equipment number, and the name of the trucking company. This allows for much faster turn times.

If the trucking company is listed on the import release issued from the shipping line to the terminal via Crescent, then Crescent will automatically fax a copy of the release to the registered trucking company at the same time the transmission is sent to the terminal. This system prevents trucking companies from dispatching truck operators to the terminal to pick up containers which have not yet been released.

Trucking companies can access Crescent with their personal computer to ascertain whether specific Bills of Lading have been released before dispatching a truck operator to the N.O.M.C. terminal.

The N.O.M.C. terminal computer system automatically prints locations for incoming containers (imports), outgoing containers (exports), chassis, and empty containers, as well as any special instructions from the steamship lines. This information is automatically printed and given to the truck operator upon arrival at the terminal gates.

An important added feature which N.O.M.C., Inc. and Crescent provide to their customers is the ability to have all pertinent cargo information entered into the Crescent computer database. This includes critical hazardous material information. In addition to this information, U.S. Customs provides Crescent with hazardous materials information regarding import loads on ships, even if the ship's cargo is only passing through (not unloaded in New Orleans). Crescent provides access to this information, through personal computers, to the Office of Emergency Management, State Police, and New Orleans Fire Department. What this service means is that, if an imported container has an accident and is damaged anywhere in the state, the response agencies have access to the contents of the hazardous cargo and the recommended treatment procedures through the Crescent computer. This service is especially beneficial in the case of misplaced or destroyed documentation. The only item required by the response team would be the container number.

N.O.M.C. is experimenting with using bar code stickers attached to the backs of the trucker's operator licenses. Initially, N.O.M.C. photocopies the truck operator's license and merges the license information with the bar code sticker in the terminal computer. This system has two advantages. The first is a reduction in time required for truck operator identification input. The gate attendant merely has to scan the bar code instead of entering a long truck operator's license identification number. The second benefit of this system is elimination of truck operator identification input error.

N.O.M.C. has a 35- to 40-minute average in-terminal truck dwell time. These times are not just container movements under ideal conditions; they include truck operators with permitting problems and any and all other problems encountered by truck operators which would extend their in-terminal dwell times. With turn times this low (some of the lowest times in the country), New Orleans Marine Contractors continues to work on new ways to improve upon the services which it is providing its customers.

Howard Container Terminal - Oakland, California

Acreage: 49
Operation Type: Primarily Grounded
Labor Union
Longshoreman: ILWA
Ofc. Personnel: None
Container Mvmts. / Month: 11,500
No. of Gates: 8 entrance, 3 exit
Terminal Opr.: Stevedoring Services of America

The most advanced aspect of this terminal is that the paperwork processing is done at booths located in each entry lane. The ILWA gate clerk actually enters all the necessary information into the computer and prints the EIR from the gate. This process is different from that of many terminals where the gate clerk fills out the paperwork, sends it into the office for processing, and waits for someone inside to enter the information into the computer, print an EIR, and then send it back out to the lanes. Terminal personnel reported average times of 2 to 3 minutes for processing at entry gate and 45 minute average truck turn times for double moves on slow days.

The management at Stevedoring Services of America (SSA) attempted to issue Identification Cards to truck operators in order to reduce gate processing times and decrease truck turn times. They found that this system required too much time with maintenance and

stopped using the system after six months. The truck operators were not always working for the same trucking company (approximately 60 companies serving the terminal), and this had to be updated in the terminal's computers (70 percent of truck operators were owner operators). When a truck operator would use an SSA chassis and a fee had to be collected, the trucking company billed would say that that truck operator was not working for that particular company on that assignment. SSA feels that this system can work, but that it should be operated on a port-wide basis. The cost for maintaining the ID files made it infeasible for SSA to continue that operation.

Howard Terminal has a system by which the truck operator or the truck operator's dispatcher can make a telephone container inquiry. This system allows the truck operator to find out whether the desired container has arrived or is approved for release from the terminal. A telephone conversation with the terminal in April of 1994 revealed that Howard Terminal has invested in, and is using, a CCTV system to improve their entry and exit gate processing system. At the time the field visit was made, they did not have a CCTV system in place.

Probably one of Howard Terminal's biggest gate problems is the railroad tracks which are in front of the entrance and exit gates. At various times during the day, train traffic impedes terminal access.

Pier 96 Container Terminal - San Francisco, California

Acreage: 70

Operation Type: Primarily Grounded

Labor Union

Longshoreman: ILWA

Ofc. Personnel: None

Container Mvmts. / Month: 8000

No. of Gates: 7 entry, 2 exit

Terminal Opr.: Stevedoring Services of America

Pier 96 was chosen for a field visit because it was one of the first container terminals in the country to use CCTV cameras for gate operations. This system has an average cost of approximately $25,000 per gate. Representatives for Stevedoring Services of America claim that this system has provided drastic reductions in their gate processing times. When truck operators enter the terminal, they pass several strategically placed cameras. A truck operator pulls up to the gate and stops (some gates are equipped with scales). At this location there is an intercom system and a printer. This printer and intercom are mounted at truck operator window level. Sitting beside the printer and intercom is another camera which is located in a position such that

when the truck operator stops at the intercom system, the camera is aimed directly at the number on the chassis the truck operator is pulling. When the truck operator stops at the intercom, the data entry clerk zooms the camera the truck operator passed when entering the terminal at the back of the container and enters the container number into the computer. The truck operator then switches to the camera that is mounted at the intercom, and reads and enters the chassis number into the computer. With this information already entered into the computer, the entry clerk asks the truck operator a few questions over the intercom and the printer at the intercom prints a sheet for the truck operator telling the location of the container to be picked up or the destination of the container to be delivered. The truck operator merely reaches out the window, takes the printout and proceeds to the printed location.

SSA at Pier 96 also has a "Quick Check Container Inquiry System" for the truck operators and dispatchers. Also, SSA is using the Automated Manifest System as well as EDI for booking.

Barbours Cut Container Terminal - Morgan's Point, Texas

Acreage: 203

Operation Type: Primarily Grounded

Labor Union

Longshoreman: ILWA

Ofc. Personnel: None

Container Mvmts. / Month: ~17,800

No. of Gates: 14 in two entry/exit complexes

Terminal Opr.: Port of Houston Authority

Barbours Cut has approximately 150 trucking companies serving the terminal. It also serves approximately 23 shipping lines. The terminal has an intermodal ship-rail service it provides to some of its steamship line customers. Barbours Cut had approximately 9,000 container ship-rail moves for the year 1993. The terminal anticipates this number will increase by the end of 1994.

Barbours Cut Container Terminal experiences some of the same problems that are faced at other terminals throughout the country. Approximately 5 to 6 percent of its containers scheduled to be placed aboard a ship do not arrive at the terminal until the ship is already loading. On one particular day of observation, there were 75 containers that had not yet arrived at the terminal when the ship was in dock. The ship was scheduled for 650 moves.

The primary complaint that the truck operators have about Barbours Cut is the excessive delays experienced while being processed at the gates. They also complain about delays and

lack of "first-in-first-out" container service when they wait to have a container mounted on their chassis.

Management is sensitive to the complaints of the truck operators and has adjusted working hours. Barbours Cut now opens an hour earlier and remains open during the lunch hour. Because of the cost of extended hours, the terminal was forced to go to a flex-time system. This means that from 7 to 8 and from 12 to 1 the gates are opened in a reduced capacity (only 3 or 4 lanes open instead of 7).

Barbours Cut has approximately 55-minute average turn times for the trucks. This 55 minutes is valid only for those trucks that do not experience a rejection due to incomplete paperwork. The trucks that are rejected and must go to customer service have a two-hour-and-15 minute (2:15) average turn time.

Barbours Cut Container Terminal and the Port of Baltimore's Seagirt Terminal are the only terminals in this study which are operated by a public entity. This means that these terminals can experience considerable influence by elected public officials. Many of the trucking companies have some measure of influence over the public officials in Houston. This is not to say that this is a bad thing. In fact, it is admirable to have public officials who will help their constituents. If the Port of Houston wanted to implement new policies that would have a seemingly damaging effect on the port servicing truck industry, then the Port of Houston could expect to hear from the trucking lobby. Some of the changes the port may decide to make to increase productivity could be perceived to have a damaging effect on the local trucking industry. In actuality, the effect would not be damaging but would require a change in the trucking companies' current system.

The one advanced technology that Barbours Cut is using is the "Barbours Cut Container Inquiry System." Unfortunately, as was indicated in the truck operators' surveys, many of the truck operators do not understand this system.

Barbours Cut experiences a 20 percent rejection rate of all its gate transactions. One in every five trucks that comes to the terminal is not prepared to conduct transactions in the current gate processing system. There are many reasons for this. However, these reasons do not make this rejection rate acceptable. The terminal management is continuously striving to overcome the reasons for those rejections.

CHAPTER 7. RECOMMENDATIONS FOR BARBOURS CUT CONTAINER TERMINAL

RECOMMENDATION PROCESS

Problem Identification

Analysis of the gate process at Barbours Cut has uncovered inefficiencies in the system which can and should be addressed. The most serious problem affecting performance is the high number of "rejects" (incomplete paperwork that cannot be processed) which occur when trucks attempt to have their paperwork processed. Rejects are usually the result of poor communication between the freight forwarder and the trucking company. This poor communication link causes the terminal and the truck operators to experience delays during gate processing. This problem results in unnecessary congestion, frustrated truck operators (as well as terminal personnel), unnecessary increases in exhaust emissions, and additional costs associated with correcting errors and reprocessing rejected paperwork.

Another problem uncovered is the time each truck has to wait while being serviced during gate processing. The 55-minute average truck turn time (total time a truck spends within the terminal) includes 26 minutes of gate processing if all paperwork is correct. If the paperwork is rejected for some reason, then the average truck turn time is over two hours. Labor costs are too high to continue to maintain a processing time of 26 minutes per truck. By reducing the processing time, the 55-minute truck turn times will decrease. One measure of the effectiveness of an intermodal transportation system is the link or transition between modes. With a decrease in the 55-minute truck turn times, the entire system becomes more efficient, the terminal becomes more productive and efficient, the truck operators are happier, congestion within the terminal decreases, and exhaust emissions will be reduced.

Solution Constraints

In order to develop a solution, some important factors had to be considered. Barbours Cut is a public terminal and is highly sensitive to the needs of its customers (steamship lines). Any changes which are made should not adversely affect those customers. Any solutions should be limited to changes within the terminal. Requiring the shipping lines, the freight forwarders, and the trucking companies to develop a better communications system is out of the terminal's realm of control.

PROPOSED SOLUTION

The proposed solution takes advantage of the existing Intelligent Transportation Systems (ITS) technologies that have been implemented at other ports around the country. No single port's ITS system can be copied and set up in operation at Barbours Cut and be expected to provide the same productive results, due to the uniqueness of each port. However, there are components of various systems which can be put together to make a new system that will be most suitable for Barbours Cut's needs. The solution presented here is designed to address the primary problems faced by the terminal. The problems addressed are the high number of rejected transactions and the excessive cost and delay associated with paperwork processing. The proposed solution is simple, is relatively low in cost, can be implemented in a short time, and is easily adaptable to new constraints and new technologies.

Solution Components

The technological hardware necessary for the proposed solution includes Automatic Vehicle Identification (AVI) for trucks, AVI readers for terminal entry and exit gates, hand-held AVI transponder readers for service lanes, and also the installation of monitors, keyboards and printers in each booth at the main lanes.

The proposed solution requires establishing a password for each trucking company to use in order to access the Barbours Cut Container Inquiry System. Further, there must be a communications link between the Container Inquiry System and the Container Inventory Control System (CONICS). The Container Inquiry System should be accessible to the trucking companies by telephone or modem. The user (trucking company) must be able to access relevant information by entering the container number or a booking number.

The new system will provide container status information much like the Barbours Cut Container Inquiry System does today. In addition to container status information, the new system will be capable of faxing information to a pre-assigned user FAX number. This FAX will include all pertinent information from the CONICS system — essentially, the information which is included in an Equipment Interchange Report (EIR): the name of the trucking company, the necessary accompanying paperwork, and the date the FAX was sent. In order for a truck to be processed under the new system the truck operator must provide the FAX or a copy of the FAX at the gate.

If a trucking company is given incorrect information concerning a container, then the problem will be solved before the truck is dispatched to the terminal. The case in which the truck operator arrives at the terminal without the necessary paperwork and signing for the container (hazardous warning, etc.) will no longer exist. The FAX the dispatcher receives from the Container

Inquiry System will tell the dispatcher whether or not the cargo is hazardous, and also whether to drop off or pick up the cargo. The situation in which a transaction is rejected because the freight forwarder does not provide the complete booking number or provides the wrong booking number will no longer occur. The dispatcher will not be given a FAX when the Container Inquiry System is accessed and an incorrect booking number is given. This will force the dispatcher to contact the freight forwarder and solve any problems before the truck arrives at the terminal.

Communications Links

The trucking company and the terminal have several means of communicating. The dispatcher can contact the Container Inquiry System (CIS) by telephone or by PC with a modem hookup. A truck operator can also access the CIS from any phone; but, while the CIS can be accessed from any location by phone, there is only one predetermined location where a FAX can be sent (figure 7.1).

Process Flow Chart

INITIAL STEPS BEFORE TRUCK IS DISPATCHED

- Trucking Company is contacted by broker or freight forwarder to go to Barbours Cut Container Terminal to pick up or deliver container.

- Trucking Company accesses the Container Inquiry System (CIS) by using company password and initiates inquiry with either booking number or container number supplied by broker or freight forwarder.

- CIS provides status information concerning container and, if container is cleared for release, prompts caller for FAX transmittal operation.

- The information from CIS is sent to the dispatcher via FAX and passed on to the truck operator.

- This FAX, or a copy, is requested from the truck operator by the terminal operator to initiate paperwork processing.

(see figures 7.2, 7.3, and 7.4)

FIGURE 7.1 COMMUNICATION LINK

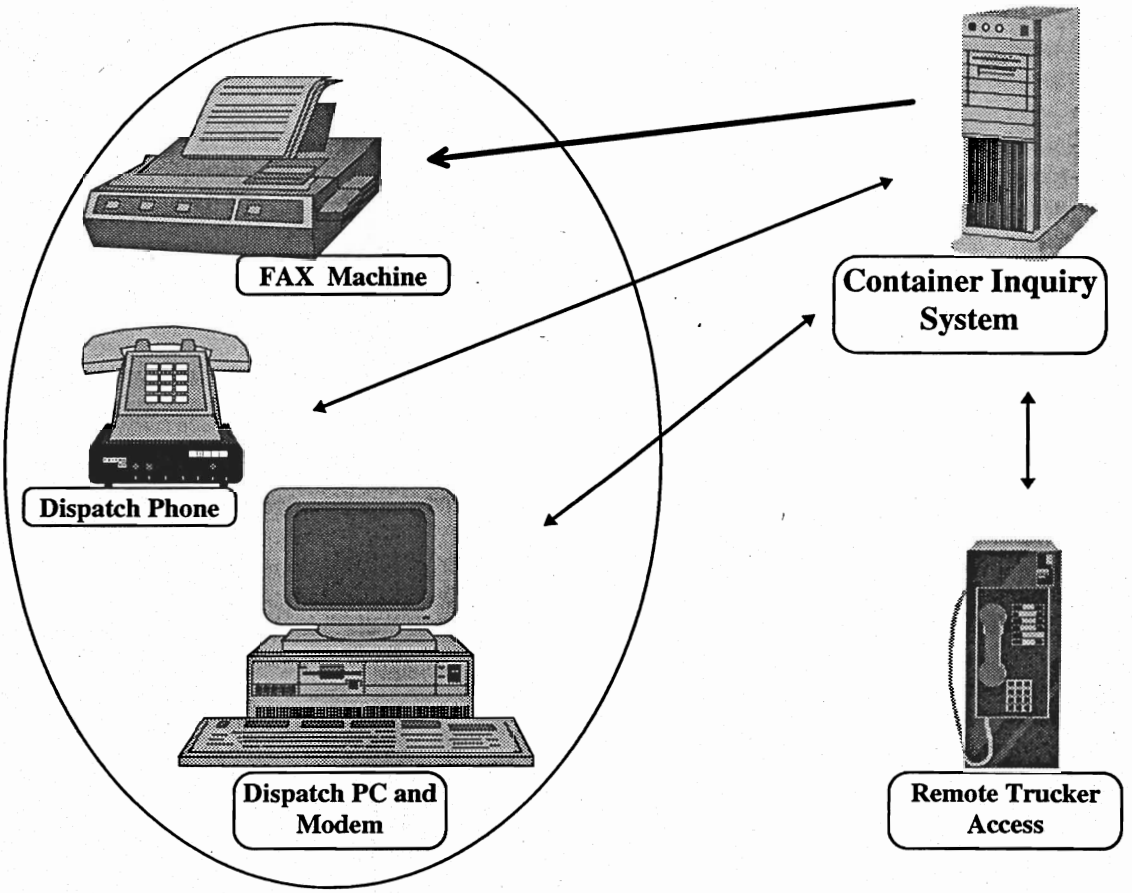


FIGURE 7.2 PROCESS FOR ENTRY INTO TERMINAL WITH EMPTY OR LOADED CONTAINER

(Processing takes 3 to 5 minutes)

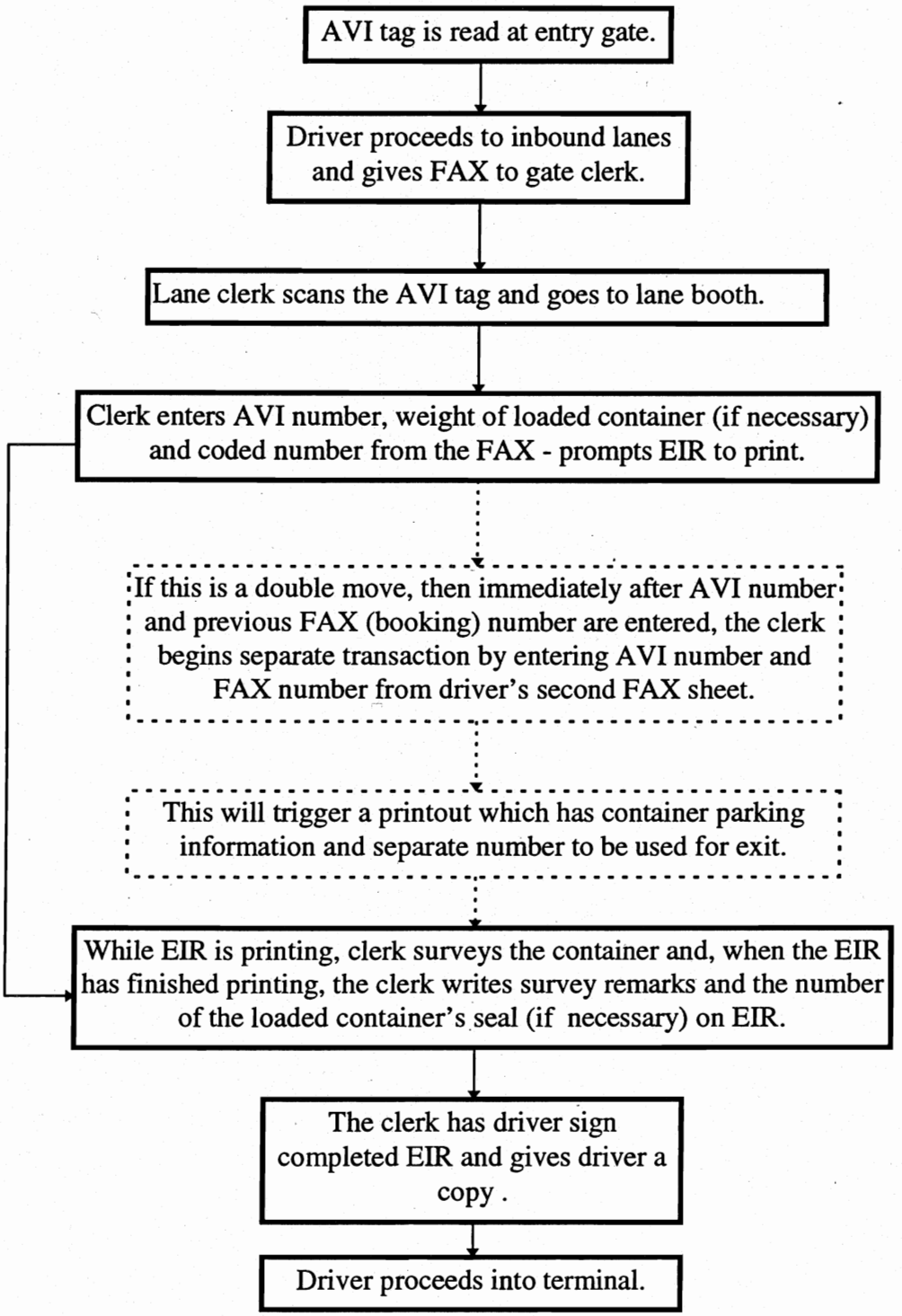


FIGURE 7.3 PROCESS FOR ENTRY INTO TERMINAL WITH BARE CHASSIS OR BOBTAIL

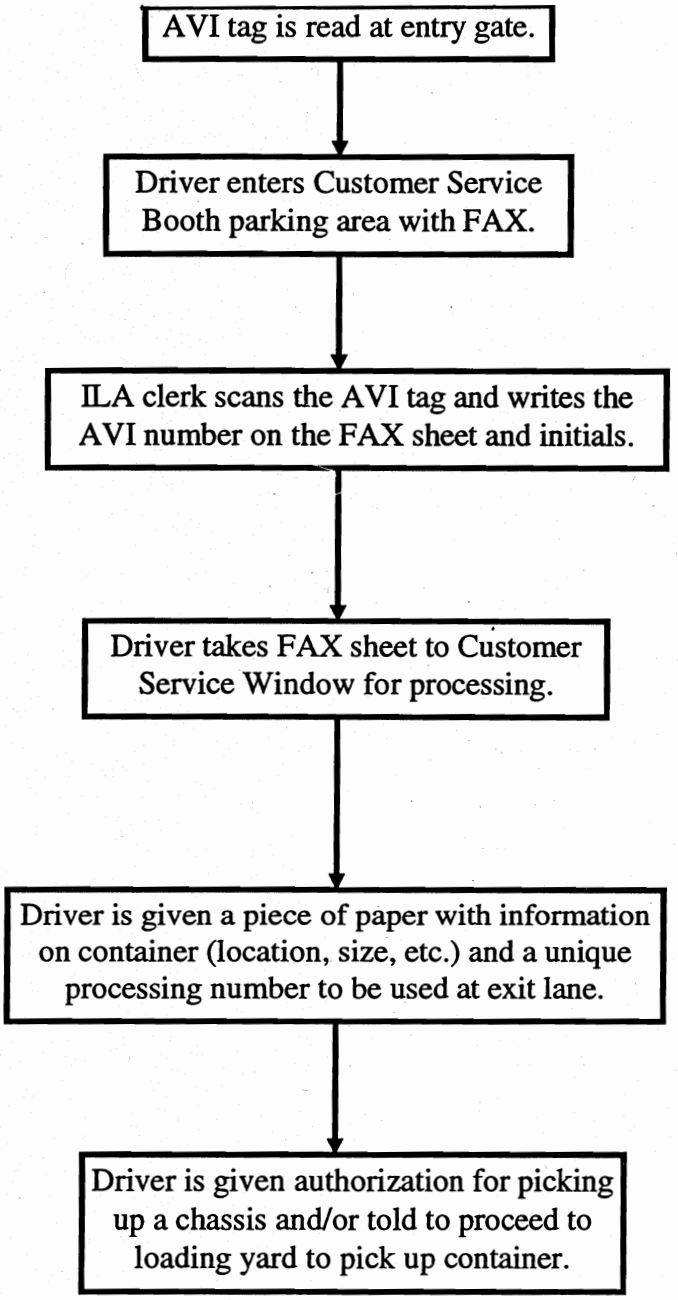
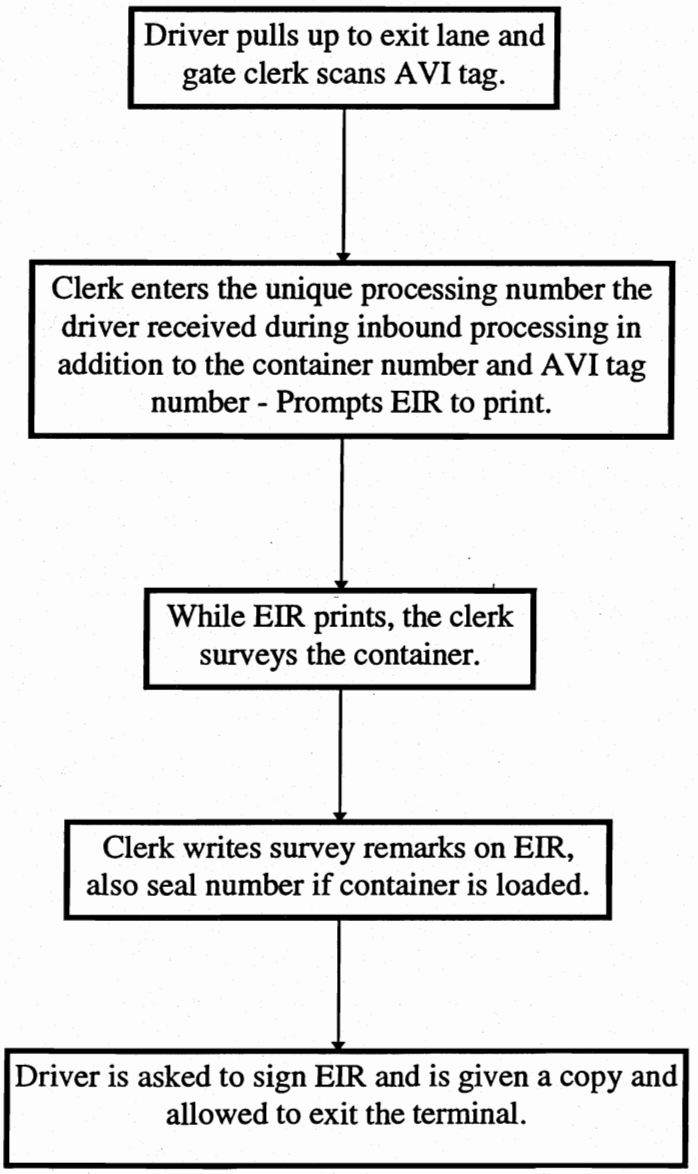


FIGURE 7.4 PROCESS FOR EXIT FROM TERMINALWITH EMPTY OR LOADED CONTAINER

(Processing takes 3 to 4 minutes.)



Solution Requirements

In order to implement this solution, there must be involvement on the part of the trucking companies. Each truck has to be equipped with a transponder. These transponders cost approximately $40.00 each. The trucking companies must have a FAX machine or a modem equipped PC.

The terminal bears the largest expense. The terminal has to install AVI readers at the entrance and exit gates and purchase hand-held AVI scanners which average about $9,500.00 each for each lane (or the terminal could incorporate fixed AVI readers at the approaches to each lane). Acquisition of AVI technology is the primary expense associated with the recommended solution. The vendor of this type of AVI system was unwilling to provide a rough estimate. The vendor (AMTECH) felt that a site visit would be necessary in order to do this.

The costs involved with developing the ability to fax information from the port will be minimal. The Port of Houston is already faxing information to some of its customers. The Container Inquiry System and the Container Inventory Control System are already linked. The expense involved in developing a new FAX output format is minimal. Operation of this new system would be accomplished by terminal personnel at no additional administrative costs.

Transferability To Future Systems

Barbours Cut is aware of the limitations within its gate processing operations. The management has been studying a plan to construct an entirely new gate complex modeled after the Port of Baltimore's Seagirt Marine Container Terminal. This complex will require constructing a new multilevel gate system which will require all trucks to proceed through lanes underneath the complex. This system would incorporate several advanced technologies and would cost several million dollars. At this time a precise estimate of the cost for a completely new entry complex is unavailable. This system would not be constructed for several years. The proposed system this report recommends is easily transferable to the new future Barbours Cut gate complex.

CHAPTER 8. CONCLUSION

This chapter presents a summary of the efforts undertaken in this research. It gives a synopsis of each of the elements, which included data collection, data analysis, and presentation of a recommended solution. The chapter also includes recommendations for further study.

SUMMARY

The tasks undertaken for this report included (1) gathering background information from other ports and terminals around the country, (2) surveying the truck operators at Barbours Cut Container Terminal, (3) interviewing Barbours Cut personnel, (4) collecting gate processing data, and finally (5) providing recommendations for improving Barbours Cut gate operations.

Background Information

Gathering background information included a survey of the literature and an examination of videos in the video library at the American Association of Port Authorities headquarters office in Alexandria, Virginia. Site visits and personal interviews were conducted at the Port Authority of New York and New Jersey's World Trade Center offices in New York, New York. Several people were interviewed at the Port Authority concerning gate operations and Intelligent Transportation System technologies in use at the New York and New Jersey port facilities. Research continued with an in-depth study of the Port Elizabeth Sea Land terminal facility. Maher Terminal in Port Elizabeth was studied and the Vice President in charge of advanced technologies was interviewed. The study continued at the Maryland Port Administration's office in Baltimore and also at Baltimore's Seagirt Marine terminal. The study included a visit to the offices and facilities of the Port of New Orleans. The Port Authority of New Orleans' Executive Director and MIS director provided valuable information in their interviews. The study also included observation and interviews with personnel at Stevedore Services of America's container terminals in both San Francisco and Oakland, California.

Barbours Cut Survey

The first step taken at the Port of Houston's Barbours Cut Container Terminal was the development and administration of a survey of the truck operators. The truck operators were asked general questions concerning their interactions with the container terminal. In addition to these general questions, truck operators were also asked for any comments concerning the terminal's current system. The truck operators were interviewed orally and also by use of a survey

instrument. The gate processing system delays seemed to be a major concern. Since gate operations appeared to be the area that provided the most trouble to the truck operators, it was chosen as the area to be studied in greater depth.

Barbours Cut Personnel Interviews

Many interviews were held with the terminal personnel. The personnel interviewed expressed some of the same concerns as the truck operators concerning the gate operations. The International Longshoreman's Association (ILA) gate clerks, the office personnel and office manager, the terminal manager, and the operations staff were interviewed. These interviews were conducted to obtain an accurate understanding of the gate operating procedures.

Collecting Gate Processing Data

The various stages of gate processing were outlined and a rudimentary data sampling strategy was implemented. The primary data elements collected were the actual processing times. Each step in the gate operation process was sampled for representative 'average' times. The samples were collected over a seven-working-day period. Averages were calculated for each step in the process.

Costs for the gate processing operations were calculated by taking employee hourly costs and multiplying those figures by the average times calculated for each step in the process. The total number of gate transactions was then multiplied by the average costs associated with each gate transaction to determine an approximate system cost.

Developing A Solution

The last step in this study was to develop a plan to reduce or eliminate costs and time delays associated with gate operations. By incorporating ITS technologies already in use at some of the more advanced container terminals around the country, an alternative concept was developed for the Barbours Cut Terminal system.

The alternative concept for Barbours Cut required two of the more established (older) ITS technologies and some simple non-technical process changes. The primary problems addressed included gate processing times which were too high and the high rate of rejected paperwork transactions caused by incomplete or incorrect paperwork provided by the truck operator. The alternative concept was designed with the unique needs and constraints (both operational and institutional) of Barbours Cut in mind. While the technology involved is not the latest technology available, it is considered more feasible for addressing the primary problems associated with the terminal's gate operations.

FUTURE STUDY

In all container terminals there are two causes of delay for trucks: gate processing and actual container loading and unloading. A complete solution to Barbours Cut's efficiency problems must address both causes. The elimination of one of the two bottlenecks with a rapid gate processing system will only result in more delay at the other bottleneck. Barbours Cut Container Terminal has recently purchased several new transtainers. These transtainers are used to load and unload containers from trucks and for loading and unloading containers from berthed ships. An optimal system is one which would reduce the delay experienced by trucks waiting to load or unload containers, and would also provide fast and efficient service for berthed ships.

Future studies should include development of a "hot-hatch" system, another name for a container priority system. Current operating procedures do not provide a means for processing a container immediately upon arrival at the terminal. For high-priority containers time is of the essence. Currently, a priority container would have to wait in the same queues as the non-priority containers. In the shipping industry, the "hot-hatch" system is a premium service that many customers desire and are willing to pay a surcharge in order to receive.

TERMINAL REACTION

Barbours Cut management were provided with a final report and presentation on May 18, 1994. The meeting included key personnel representing the ILA, office personnel, and terminal MIS, as well as the terminal manager. During the meeting several ideas were discussed involving the development of pilot procedures. A follow-up staff meeting was held on June 20, 1994. This meeting was planned to further discuss implementation strategies.

The June 20 meeting was attended by the terminal manager, the office personnel manager, and the terminal operations manager. Several items were identified which must be addressed before the recommended plan can be instituted.

1. *Shipping Lines*
2. *Trucking Lines with AVI and SCAC Codes*
3. *Cost Factor*
4. *Lane Dedication with 800 Trucks*
5. *Systematic Phasing of Plan*
6. *Labor Issues*
7. *Load Allocation*
8. *Back-Up for System*

9. *Duration of Dual System*

10. *Fail-safe Security?*

11. *Plan Introduction*

Shipping Lines. The problems concerning shipping lines stem from the a priori requirements placed on Barbours Cut Container Terminal. The steamship lines currently require the terminal to check whether information provided by the truck operator matches information provided by the steamship line on the CONICS system. This system requires the terminal to do additional work and acts as a check system for the steamship lines. This type of system allows the steamship lines to save the time needed to verify that the information provided by the broker or freight forwarder is correct. Approximately 20 percent of the transactions are incorrect and are caught by Barbours Cut personnel. The steamship lines would rather have the terminal call to correct that 20 percent. They feel that this is preferable to self-checking 100 percent of the transactions before the trucks arrive at the terminal.

The recommended system will require that all errors be corrected before the trucks arrive at the terminal. This will alleviate much of the congestion and lower the costs associated with terminal personnel correcting rejects. The problem arises because brokers, freight forwarders, and steamship lines have grown comfortable with the current system. They are not attempting to achieve 100 percent error-free transactions because they realize the current system requires the terminal to double-check every transaction. Any changes to this system will meet with opposition unless attractive incentives are provided. The most attractive incentive identified included offering participating steamship lines reduced rates.

Terminal personnel feel that this will probably be the most difficult of all obstacles to overcome. They have identified four steamship lines which have an active commitment to customer satisfaction and a substantial amount of business at Barbours Cut. Those lines are Maersk, P&O, Ned Loyd, and COSCO shipping lines. These lines will be targeted as pilot participants.

Trucking Lines with AVI and SCAC Codes. Many of the trucking lines serving Barbours Cut Container Terminal are made up of owner operators. Many of these owner operators are working for more than one trucking line. Each trucking line has a unique Standard Carrier Alpha Code (SCAC). A problem occurs when the SCAC Code which is encoded on the AVI transponder mounted on the truck is not correct. In other words, the owner operator might have an AVI transponder tag which has encoded on it the SCAC code for Houston Trucking, when in actuality the truck is on an assignment for South Texas Trucking Line.

This problem is one that is significant but not one which cannot be overcome. Currently, trucks are arriving at the terminal that are working for one trucking line but that have a sticker identifying that particular truck as being in the service of another trucking line.

Cost Factor. The exact costs associated with implementing the recommended solution have not been identified. Terminal personnel are aware that the overall cost would be minimal and that savings realized from the elimination of rejects would more than justify initial costs. Terminal personnel agree that this is perhaps the smallest obstacle to overcome and much of the required technology is already in use by the Port of Houston Authority.

Lane Dedication with 800 Trucks. Another concern brought up by the management was that involving the early stages of implementation. With the existing system, the congestion at the main gates is very high. Initially dedicating lanes exclusively for trucks participating in the new system will have a strong negative effect on the congestion problem. Very few trucks will participate at first, and remaining trucks will be forced to use the remaining lanes. Until more trucking lines become participants in the new system, the terminal will actually be adding to the congestion problem by reducing the capacity without reducing the demand.

The most feasible solution identified is to begin implementation of the recommended solution at one of the other two gate entry complexes. These other entry points do not encounter as much congestion as the main gate complex, and the other entry points usually process trucks serving specific shipping lines. These specific shipping lines are those targeted for piloting purposes. This suggestion has its advantages, because the main gate complex processes trucks from all 23 shipping lines served. Using the other gate complexes will cause less disruption of truck traffic.

Systematic Phasing of Plan. The systematic phasing of the plan was not quite clear in the minds of the terminal personnel. It was unclear how to integrate the recommended plan into the main gate complex with minimum disruption.

One phasing plan identified involves successful implementation of the pilot at the minor gate entry complexes. At that point, the terminal would invite the other shipping lines, freight forwarders, brokers, and trucking lines to the pilot lanes and allow them to observe the operation and to see the increased efficiencies and productivity levels. These groups would be informed that the reduction in processing costs could be passed on to non-participating shipping lines if they should decide to participate.

Labor Issues. The biggest concern identified concerning labor is that of the ILA clerks actually entering information into the computer. Currently, Barbours Cut has office personnel

dedicated to this task. This recommended system may call for the elimination of office personnel jobs. There is also some concern about the acceptance of the recommended plan by ILA workers. It was mentioned that, at one terminal, a new system involving hand-held communication devices used for real-time location of containers was not completely understood by some of the ILA personnel using the devices. What resulted were several expensive hand-held units which were accidentally dropped and broken.

These problems can be addressed by educating the users of the new system about its benefits and including the users in the planning stages. The automatic elimination of jobs with the implementation of the recommended plan should not be necessary. There is much work which the office personnel can be retrained to perform. By doing this, the Port of Houston will actually be saving money by not having to hire additional personnel.

Load Allocation. Load allocation is a term used for parking assignment. The issue involving load allocation concerns current operations which require manual location of parking assignment. The recommended system has a computerized parking allocation system. Often parking is done manually because a container may contain a hazardous cargo and require special locating instructions. Empty containers are all allocated manually and parking locations are determined by the existing locations of empties. A conscious effort is made to keep the yard balanced. It is not always good to have all empties parked in one location. This allows unnecessary congestion to concentrate at one location.

The parking allocation problem is one which can be overcome. All hazardous cargo can still go through the manual process; empties can likewise go through a manual process. Dedicated lanes will be necessary for both types of containers to keep the faster (computerized) lanes free to process non-specialized container cargo.

Back-Up for System. The issue of a back-up for the system in the case of computer malfunction is a valid concern. This problem has the potential for creating a great deal of chaos.

The back-up system issue is, however, one which can be overcome. There are several terminals that are utilizing automated systems which have back-up capability. These terminals should be consulted, and the Port of Houston Management Information System (MIS) department also should be consulted.

Duration of Dual System. This issue involves costs associated with maintaining a dual system of processing at the main gate complex. Not all trucking companies will be equipped with transponders or will have the FAX transmittal required for gate processing. For those trucks arriving without prior knowledge of the new system, the old methods of processing will have to be

employed. In order to accomplish this, office personnel will still be required. How long should the terminal have to incur operating costs of two separate systems?

A solution to this problem is for the trucks requiring processing in the old method to be handled at the customer service booth. They will take longer to process, but the overall efficiency of the terminal and the other participating drivers will not be compromised.

Fail-safe Security? Fail-safe security is a very important issue which concerns the ability for someone to override the checks which exist in the recommended system. This can result in the theft of goods from within a container or of the entire container. Even with the existing system, given all of its checks, thefts still occur.

In order to overcome this obstacle, the terminal will have to enlist the aid of ILA personnel, Port of Houston MIS personnel, office personnel, brokers, freight forwarders, and the shipping lines. A group effort will be necessary to develop the safest processing methods.

Plan Introduction. Barbours Cut Container Terminal has periodic meetings called "CONICS Users' Meetings." These meetings consist of members of steamship lines, trucking lines, and freight forwarders. The terminal management will enlist the aid of the Port of Houston Authority MIS personnel and develop a presentation introducing the recommended solution to the targeted steamship lines (Maersk, P&O, Ned Loyd, and COSCO), freight forwarders, and trucking lines. This CONICS Users' Meeting will be held in August or September of this year (1994). The terminal has not yet determined how much prices can be lowered for the shipping lines if they participate, nor has it been determined at which of the gate entry complexes to start the pilot program. When these questions can be answered, the new plan will be introduced.

CONCLUSION

It is important to note that during the analysis and recommendation phase of this study for Barbours Cut gate operations, the problems were examined first, and only then were suitable technologies recommended. Too often the technologies are examined first and then problems are found that the latest technologies can address. This approach can result in costly high-tech systems which do not adequately address the root problems of a container terminal.

This research has summarized gate processing data, provided cost estimates of current gate operations, and outlined an alternative solution concept to the problems that are faced daily by the terminal.

APPENDIX A

BARBOURS CUT TRUCK DRIVER'S SURVEY

Commercial Vehicle Operations (CVO)

These survey questions are designed to characterize port CVO traffic. It is designed to acquire Origin - Destination information, establish what communication systems are in operation and what are the routing patterns connected with trucks servicing the port . The results of this survey will be used to improve port related trucking operations, enhance the traffic congestion level information which is (or is not) distributed to the truck operators and provide a clearer overall view of port operations from the CVO perspective.

Operator's Survey

Name of trucking company _____

Date _____ Time of Day _____ AM PM

SHIPMENT SPECIFIC

When did you get the assignment for this shipment?

First thing in AM _____ During this workday _____

End of business yesterday _____ Yesterday morning _____

Earlier than yesterday _____

How long have you been waiting for this shipment to load/unload so far?

0-10min. ____ 15-30min ____ 30-45min ____ 1-2hrs.____3+hrs.____

How long do you think you will have to wait from the time you entered the terminal until you leave the terminal? (total time)

0-10min.__ 15-30min__ 30-45min__ 1-2hrs.__3+hrs.__ no idea __

What are you hauling?

Bringing in_____Taking Out_____

Where is this load or empty going to or coming from?

Coming from_____Going to_____

What route are you going to take when you leave the port today?

(Hwys. and major roads)

_____

GENERAL INFORMATION

Do you own your truck?

Yes _____ No _____

If you own your truck are your services leased to a trucking company or are you in business for yourself (find your own customers)?

Lease my services __ Business for self __ N/A ___

How long ago was your last assignment at this port?

<1 week ago ____ 1-2wks ago____ 2-4wks ____ >1 month ago_____

On the average how often do you get an assignment at this port?

more than once a week ___ once a week ___ more than once a month____ once every 2 mos.____ once every 3-6 mos____ longer___

no particular frequency ____

When you get port assignments how many loads or empties do you pick up or drop off from the terminal per day on the average?(total)

1 ___ 2 ___ 3 ____ 4___ 5 + ___

How much time do you <u>usually</u> spend within the port?

0-10min.____ 15-30min____ 30-45min____ 1-2hrs.____3+hrs.____

Which terminals do you typically deliver and pick up goods from? (check all that apply)

Barbours Cut ____ Jacintoport ____ Turning Basin ____ Bayport ____

Bulk Materials ____

What do you think the congestion level is within the port?

None____ Slight _____ Moderate _____ Heavy ____ Very heavy _____

What do you think the congestion level is to and from the port?

None____ Slight _____ Moderate _____ Heavy ____ Very heavy____

Do you think changes in the port's hours of operation would reduce congestion problems to the port?

Yes _____ No _____ Don't know _____

COMMUNICATION INFORMATION

How often do you communicate with the dispatcher each day?

Not at all ____ 1 time ____ 2-4 times ____ 5+ times _____

How often do you contact dispatch by phone each day?

Not at all ____ 1 time ____ 2-4 times ____ 5+ times _____

When do you usually get your assignments?

Days in advance_____ First thing every morning_____

Various times during the day_____

How often does dispatch change your assignment during the day?

Very often____ Occasionally_____ Hardly ever_____ Never_____

What kind of communication system do you use in your truck? (check all that apply)

No communication system ___CB __ Cell. phone __ 2 way radio __ Fax__ Beeper __ Other (please specify) _____

Do you have a terminal in your vehicle for sending and/or receiving text messages? (you can send or receive info printed out on paper)

Yes _____ No _____

Does your truck have either a transponder mounted on it or do you have some type of electronic tolltag device?

Yes _____ No _____

Is an automatic vehicle location (AVL) or vehicle tracking system in use?

Yes _____ No _____

If there is AVL or other tracking system in use who is the manufacturer?

_____

Would you like up to the minute traffic reports directly from the port?

Yes _____ No _____

If yes, how would you like to receive them?

From dispatch_____ AM radio signal transmitted from the port_____

Changeable message signs at terminal exits_____ Other_____

If you already get traffic updates how do you get them?

Dispatch ___ AM/FM radio ___ Dedicated AM traffic advisory station___ CB ____

Other_____

Do the traffic updates give you enough time to reroute?

Yes _____ No _____

Does dispatch provide you with an alternative route?

Yes _____ No _____

ROUTING INFORMATION

How many miles was your longest port related haul?

1-15 __ 20-50 __ 55-90 __ 100-200 __ 200-500 __ 500+__

How many miles do you haul your load to or from the port on the average?

1-15 __ 20-50 __ 55-90 __ 100-200 __ 200-500 __ 500+__

Are there routes which the state or the port require you to use? (not including haz. materials or oversize loads)

Yes _____ No_____ Don't know _____

Are there marked or designated truck routes to and from the port?

Yes _____ No _____ Don't know _____

Do street signs clearly direct out of town truckers from major streets and freeways to marine terminals?

Yes _____ No _____ Don't know _____

Are the streets wide enough for the trucks to safely turn around the corners on your routes?

Yes _____ No _____

Are there bridges posted with weight limits on any of your port related routes?

Yes _____ No _____ Don't know _____

Is port truck traffic limited by the state, port, or neighborhood to certain hours? (not including haz. mats. or oversize loads)

Yes _____ No _____ Don't know _____

Which area within Houston do you usually deliver to?

Outside loop 610_____ Within loop 610_____

NE __ SE ___ SW ___ NW __ /////// NE __ SE ___ SW ___ NW ____

The entire Houston metropolitan area _____ Never del. in Houston____

Which area within Houston do you usually pick up from?

Outside loop 610_____ Within loop 610_____

NE __ SE ___ SW ___ NW __ /////// NE __ SE ___ SW ___ NW ____

The entire Houston metropolitan area _____ Never pick up in Houston___

When you haul a load north of Houston which route do you usually use?

(an example would be: SH146 - SH225 - IH610W (or 610N) - IH45)

or N/A (never leave Houston city limits)

_____

When you haul a load south of Houston which route do you usually use?

(an example would be: SH146 - SH225 - Beltway 8 - US59)

or N/A (never leave Houston city limits)

_____

When you haul a load west of Houston which route do you usually use?

(an example would be: SH146 - SH225 - IH610W (or 610N) -IH10)

or N/A (never leave Houston city limits)

_____

When you haul a load east of Houston which route do you usually use?

(an example would be: SH146 - IH10)

or N/A (never leave Houston city limits)

_____

Additional comments (optional)

Do you think the additional hours (open an hour earlier and open during the lunch hour) have had a significant impact on your

productivity?_____

_____

_____

Why do you think the Barbours Cut Terminal Container Inquiry System is hardly being used at all? (This is the system where you or your dispatcher can call the terminal computer and get the status (cleared or not cleared for release) on any container in the terminal before arriving at the port.)

Do you have any realistic recommendations to the Dept. of Transportation on how to make your trips to and from the port any easier?

Any overall comments on how to make your job easier and how to help make you a more productive port servicing truck driver?

APPENDIX B

BARBOURS CUT TRUCK DRIVER'S SURVEY RESPONSES

SHIPMENT SPECIFIC

When did you get the assignment for this shipment?

First thing this morning **_22_** During this workday **_30_**

End of business yesterday **_8_** Yesterday morning **_5_**

Earlier than yesterday **_3_**

How long have you been waiting for this shipment to load/unload so far?

0-10min. **_14_** 15-30min **_19_** 30-45min **_14_** 1-2hrs.**_13_**3+hrs.**_4_**

How long do you think you will have to wait from the time you entered the terminal until you leave the terminal? (total time)

0-10min.**_1_** 15-30min**_7_** 30-45min**_21_** 1-2hrs.**_26_**3+hrs.**_6_** no idea **_6_**

What are you hauling?

Bringing in_____Taking out_____

Where is this load or empty going to or coming from?

Coming from_____Going to_____

What route are you going to take when you leave the port today?

(Hwys. and major roads)

_____

GENERAL INFORMATION

Do you own your truck?

Yes **_38_** No **_29_**

If you own your truck are your services leased to a trucking company or are you in business for yourself (find your own customers)?

Lease my services **_38_** Business for self **_0_** N/A **_10_**

How long ago was your last assignment at this port?

<1 week ago _**54**_ 1-2wks ago_**3**_ 2-4wks _**8**_ >1 month ago_**4**_

On the average how often do you get an assignment at this port?

more than once a week _**50**_ once a week _**7**_ more than once a month_**4**_ once every 2 mos._**1**_ once every 3-6 mos_**1**_ longer_**0**_

no particular frequency _**5**_

When you get port assignments how many loads or empties do you pick up or drop off from the terminal per day on the average?(total)

1 _**26**_ 2 _**30**_ 3 _**9**_ 4_**2**_ 5 + _**4**_

How much time do you <u>usually</u> spend within the port?

0-10min._**0**_ 15-30min_**1**_ 30-45min_**13**_ 1-2hrs._**48**_3+hrs._**9**_

Which terminals do you typically deliver and pick up goods from? (check all that apply)

Barbours Cut _**64**_ Jacintoport _**17**_ Turning Basin _**27**_ Bayport _**9**_

Bulk Materials _**5**_

What do you think the congestion level is within the port?

None_**1**_ Slight _**5**_ Moderate _**33**_ Heavy _**26**_ Very heavy _**4**_

What do you think the congestion level is to and from the port?

None_**4**_ Slight _**8**_ Moderate _**40**_ Heavy _**15**_ Very heavy _**1**_

Do you think changes in the port's hours of operation would reduce congestion problems to the port?

Yes _**35**_ No _**16**_ Don't know _**18**_

COMMUNICATION INFORMATION

How often do you communicate with the dispatcher each day?

Not at all **_1_** 1 time **_6_** 2-4 times **_29_** 5+ times **_33_**

How often do you contact dispatch by phone each day?

Not at all **_11_** 1 time **_13_** 2-4 times **_31_** 5+ times **_12_**

When do you usually get your assignments?

Days in advance**_6_** First thing every morning **_32_**

Various times during the day**_46_**

How often does dispatch change your assignment during the day?

Very often**_10_** Occasionally**_29_** Hardly ever**_26_** Never**_4_**

What kind of communication system do you use in your truck? (check all that apply)

No communication system **_16_**CB **_29_** Cell. phone **_9_** 2 way radio **_24_** Fax **_4_** Beeper **_17_** Other (please specify) **_5_**

Do you have a terminal in your vehicle for sending and/or receiving text messages? (you can send or receive info printed out on paper)

Yes **_4_** No **_65_**

Does your truck have either a transponder mounted on it or do you have some type of electronic tolltag device?

Yes **_3_** No **_65_**

Is an automatic vehicle location (AVL) or vehicle tracking system in use?

Yes **_2_** No **_67_**

If there is AVL or other tracking system in use who is the manufacturer?

_____

Would you like up to the minute traffic reports directly from the port?

Yes _**48**_ No _**20**_

If yes, how would you like to receive them?

From dispatch_**15**_ AM radio signal transmitted from the port_**32**_

Changeable message signs at terminal exits_**16**_ Other_**1**_

If you already get traffic updates how do you get them?

Dispatch _**7**_ AM/FM radio _**35**_ Dedicated AM traffic advisory station_**3**_

CB _**30**___ Other_**1**_

Do the traffic updates give you enough time to reroute?

Yes _**37**_ No _**23**_

Does dispatch provide you with an alternative route?

Yes _**14**_ No _**40**_

ROUTING INFORMATION

How many miles was your longest port related haul?

1-15 _**2**_ 20-50 _**12**_ 55-90 _**6**_ 100-200 _**7**_ 200-500 _**15**_ 500+_**25**_

How many miles do you haul your load to or from the port on the average?

1-15 _**3**_ 20-50 _**25**_ 55-90 _**9**_ 100-200 _**10**_ 200-500 _**13**_ 500+_**8**_

Are there routes which the state or the port require you to use? (not including haz. materials or oversize loads)

Yes _**9**_ No_**49**_ Don't know _**10**_

Are there marked or designated truck routes to and from the port?

Yes _**32**_ No _**31**_ Don't know _**5**_

Do street signs clearly direct out of town truckers from major streets and freeways to marine terminals?

Yes _**15**_ No _**46**_ Don't know _**7**_

Are the streets wide enough for the trucks to safely turn around the corners on your routes?

Yes _**58**_ No _**11**_

Are there bridges posted with weight limits on any of your port related routes?

Yes _**32**_ No _**30**_ Don't know _**7**_

Is port truck traffic limited by the state, port, or neighborhood to certain hours? (not including haz. mats. or oversize loads)

Yes _**16**_ No _**27**_ Don't know _**24**_

Which area within Houston do you usually deliver to?

Outside loop 610_**29**_ Within loop 610_**16**_

NE _**10**_ SE _**13**_ SW _**7**_ NW _**8**_ /////// NE _**7**_ SE _**10**_ SW _**6**_ NW _**6**_

The entire Houston metropolitan area _**33**_ Never del. in Houston _**5**_

Which area within Houston do you usually pick up from?

Outside loop 610_**21**_ Within loop 610_**14**_

NE _**7**_ SE _**7**_ SW _**6**_ NW _**6**_ /////// NE _**6**_ SE _**8**_ SW _**5**_ NW _**7**_

The entire Houston metropolitan area _**38**_ Never pick up in Houston _**2**_

When you haul a load_north_ of Houston which route do you usually use? (an example would be: SH146 - SH225 - IH610W (or 610N) - IH45) or N/A (never leave Houston city limits)

_____

When you haul a load south of Houston which route do you usually use?
(an example would be: SH146 - SH225 - Beltway 8 - US59)
or N/A (never leave Houston city limits)

_____

When you haul a load west of Houston which route do you usually use?
(an example would be: SH146 - SH225 - IH610W (or 610N) -IH10)
or N/A (never leave Houston city limits)

_____

When you haul a load east of Houston which route do you usually use?
(an example would be: SH146 - IH10)
or N/A (never leave Houston city limits)

_____

Additional comments (optional)

Do you think the additional hours (open an hour earlier and open during the lunch hour) have had a significant impact on your productivity?

_____

_____

_____

Why do you think the Barbours Cut Terminal Container Inquiry System is hardly being used at all? (This is the system where you or your dispatcher can call the terminal computer and get the status (cleared or not cleared for release) on any container in the terminal before arriving at the port.)

_____

_____

_____

Do you have any realistic recommendations to the Dept. of Transportation on how to make your trips to and from the port any easier?

_____

_____

_____

Any overall comments on how to make your job easier and how to help make you a more productive port servicing truck driver?

_____

_____

_____

Following is a compilation of answers to questions on the survey which required the truck drivers to answer by filling in the blanks. These comments appear exactly as the drivers submitted them.

TRUCKING COMPANY NAME	NUMBER	TRUCKING COMPANY NAME	NUMBER
ACE TRANSPORTATION (1)	1	MERCHANTS	36
ACE TRANSPORTATION (2)	2	M.E. TAYLOR (1)	37
AGRICULTURAL CARRIER	3	M.E. TAYLOR (2)	38
ANYTIME CARTAGE CO. INC.	4	M&L TRUCK LEASING	39
BEST DEL SYST. INC.	5	MONTGOMERY TANK LINES	40
BEST TRANSPORTATION	6	OVERLAND EXPRESS (1)	41
CLARK FREIGHT LINES (1)	7	OVERLAND EXPRESS (2)	42
CLARK FREIGHT LINES (2)	8	P-H	43
CLARK FREIGHT LINES (3)	9	PORT DISPATCH SERVICE	44
CLARK FREIGHT LINES (4)	10	ROBIN	45
CLARK FREIGHT LINES (5)	11	SCHNEIDER NATIONAL	46
CMS (1)	12	SHIPSIDE CRATING	47
CMS (2)	13	SOUTHERN CARRIERS (1)	48
CRISIS TRANSPORTATION (1)	14	SOUTHERN CARRIERS (2)	49
CRISIS TRANSPORTATION (2)	15	SOUTHERN CARRIERS (3)	50
CTI	16	STATE TRANSPORT	51
DOC JONES	17	TEXAS NATIONAL TRANSPORT	52
DYNAMIC	18	TRAIL BLAZER	53
DYNASTY	19	TRANSMAR TRUCKING	54
EMPIRE (1)	20	TRANSPORTER INC.	55
EMPIRE (2)	21	UNION PACIFIC MOTOR FRT.	56
EMPIRE (3)	22	UNLIMITED (1)	57
EMPIRE (4)	23	UNLIMITED (2)	58
ENGLAND TRANS. CO.(1)	24	VENTURE	59
ENGLAND TRANS. CO.(2)	25	WWR	60
EXCARGO	26	YOWELL INTERNATIONAL	61
GETRO DELIVERY INC.	27	NOT GIVEN	62
HAULCO	28	NOT GIVEN	63
HERMANN FORWARDING CO.	29	NOT GIVEN	64
HOOVER (1)	30	NOT GIVEN	65
HOOVER (2)	31	NOT GIVEN	66
HORIZON	32	NOT GIVEN	67
LONE STAR TRANSPORTATION	33	NOT GIVEN	68
MALONE (1)	34	NOT GIVEN	69
MALONE (2)	35	NOT GIVEN	70
		NOT GIVEN	71

TRUCKING COMP. NUMBER	BRINGING IN	TAKING OUT
1	DRY BOXES 20	DRY 20
2		EMPTY 20'
3	EMPTY CONTAINERS	
4		CONTAINERS
5		TIN INGELS
6		CHEMICAL
7		
8		PIPE FITTING
9		PIPE
10	CONTAINERS	CONTAINERS
11		EMPTY
12	TANK X	TANK X
13	ATANK ISOTANK	
14	ACROLEIW	
15	TANK ACROLINE	
16		FURNITURE CONTAINER
17	PETROLEUM PROD.	
18		20' CONTAINER
19		
20	PLASTIC	NOTHING
21	INBOUD	INBOUND
22		
23	FEED SUPPLEMENT	
24		
25	EMPTY CONTAINER	
26		DRUMS/TAR
27		LOADED 20' CONTAINER
28	LIVERS & HEARTS	
29		EMPTY BOX
30	BOBTAIC	LOAD
31		20' CONTAINER
32	CONTAINERS	CONTAINERS
33		CONT + CHASSIS
34		EMPTY
35		EMPTY 40' BOX

TRUCKING COMP. NUMBER	BRINGING IN	TAKING OUT
37	PLASTIC CONT.	EMPTY 20'
38	RUBBER	EMPTY
39	SCRAPE STEEL	KOBE/NAGOYA
40		EMPTY ISOTANK
41	BROCCALI	EMPTY
42	CONT & CHASSIS	CHASSIS
43		CONTSHIP ITALY
44	EMPTY	CHEMICAL LOAD
45		UNKNOWN
46		ALKANOX
47		EMPTY
48		FARM MACHINERY
49	LOAD	LOAD
50	BOB TAIL	20' CONTAINER
51		RUBBER HOSES
52		PAPER
53		LOAD
54		EMPTY
55	MANGOS	UNCROWN
56		TANKS
57	SCRAP METAL	
58	COSCO LOAD	
59		
60	PLASTIC LINING	
61		AIRPLANE PARTS
62		PAPER
63		LOAD
64		TANK CONTAINER
65		MIN OIL
66	CLOTHES	EMPTY
67	STEEL SCRAP	EMPTY
68	TANK	TANK
69		
70		
71		

TRUCKING COMP.		
NUMBER	COMING FROM	GOING TO
1	BCT	TRIDA
2		TRIAS POTT
3		
4	NEW ORLEANS	I-59 N
5	BARBOURS CUT	6015 MURHPHY AVE
6		SEABROOK
7	HOUSTON	HOUSTON
8		STAR PIPE
9		STAR PIPE
10	HOUSTON	ITALY
11		HOUSTON
12	FRANCE	FREEPORT
13		NATWERP
14	BAKER DAYTOU TX	
15	BAKER CHIM.	
16		SF
17	LYONDELL PETROCHEM.	HONGKONG
18	KOBE	
19	C2	NEW ORLEANS
20	INTERPAK	
21	LAREDO	GERMANY
22		LAREDO
23	SI WHSE	BCT LAPORTE TX
24	HOUSTON	O.K.
25	DALLAS	BECUT
26		HOUSTON
27		HOUSTON
28	LUFKIN TX	THAMESPORT
29		HOUSTON
30	BCT	HOUSTON
31	BARBOURS CUT	HOUSTON
32	B.N. RR TERMINAL	
33	HOUSTON	ROTTERDAM
34		CALSBAD, NM
35		NEW ORLEANS

TRUCKING COMP.		
NUMBER	COMING FROM	GOING TO
36	CHATHAM NJ	
37	BAYTOWN TX	ANTWEEP
38	ORANGE TX	BELGIUM
39	HOUSTON	
40		DEER PARK TX
41	?	?
42	SEAPAC BAYTOWM	ROTTERDAM
43	ITALY	DALLAS
44	IMPORT LOAD	HOUSTON
45		MERCHANT
46		ENIELTEM
47		UNKNOWN
48		CORSICANA TX
49	DALLAS	DALLAS
50		SP RAIL HOUSTON
51		HOUSTON
52		HOUSTON
53		AUSTIN
54		VIVIAN LA
55	MEXICO	SWITZERLAND
56	IRELAND	HOUSTON
57	TYLER TX	HONG KONG
58	WACO TX	
59	OVERSEAS	DENVER
60	HOUSTON	ANTWERP
61	SPAIN	LONG BEACH CA
62		STILLWATER OK
63		LOCAL
64		BAYPORT TX
65	LE HARVE ?	HOUSTON
66	EL PASO	CANADA
67	HOUSTON	KOREA
68		
69	GUNDIE	HOLLAND
70		
71		

TRUCKING COMP.	
NUMBER	ROUTE TAKING TODAY
1	146, 225, 610
2	BC BLVD, 225, 610N
3	225
4	I-146, I-225
5	225N, 610W, MYKAWA RD, MURPHY RD
6	146, PORT RD
7	146, 225W, 610N
8	146, 225, I10W, 6S
9	I10, HWY 6
10	146, 225, 10
11	225
12	146, HWY 6, CT 2004, 288, 322
13	225
14	225, BW 8, HWY 90
15	146, 225, BW8, HWY 90
16	BCB, 146, 225, 610, 35
17	146, 225
18	225, 610N
19	146, I -10E
20	225
21	I-10W, 35S
22	59 S
23	225W, 610N, I-10W, WAYSIDE EXIT
24	I45
25	225
26	225
27	146, 225, BROADWAY
28	225. 610, 59
29	146, 225, I-10
30	225, I-10, 6, 10
31	146, 225, I-610, I-10
32	145E, 225S, 610W, HEMPSTED RD
33	146 , 225, LOOP 610, I-45
34	I-10W
35	146, 300, I-10

TRUCKING COMP. NUMBER	ROUTE TAKING TODAY
36	225N
37	146
38	146, I-10, 61, 87, 1006
39	BARBOURS CUT BLVD, 146, 225, 610
40	225
41	225, 610
42	BLC, 146, SPUR 55
43	146, 225, 610, 45N
44	225, 610, 35
45	146N, 225W, 110N
46	BARBOURS CUT RD, 146S, 225W, BW8N, I-10W
47	146, SPUT, I-10, SHELDON, JACINTO PORT BLVD
48	146, 225, 610, I-45
49	146. 225, 610, 45
50	146, 225, 610, I-10
51	225, 610N, I-10W, 59S
52	225, 610
53	290
54	59N, 259N, 20W
55	59, 77
56	146, 225, 610
57	225, 610
58	225
59	146, 225, 610
60	146, 225, 610
61	PERMIT ROUTING
62	288, I-45, I-35
63	225, I-10
64	146
65	225, 610
66	225, 45
67	225, 146
68	
69	
70	
71	

COMPANY #	ROUTE TAKEN WHEN HEADED NORTH	ROUTE TAKEN WHEN HEADED SOUTH
1	SH146, SH225, IH610W, IH45	SH146,US59
2		
3	I45	NONE
4	I10W	I59N
5	SH146, IH610W, 610N	US59
6		
7	IH610W/N, IH45	SH146, SH225
8	SH146, SH225, IH610N, IH45	SH146, SH225, US59
9	IH45	US59
10	N/A	N/A
11	IH45	US59
12	IH45	US59
13	IH45	US59
14	SH146, SH225, IH610N	SH146, SH225, LOOP 610, US59
15	SH146, SH225, IH610N	SH146, SH225, 610N, US59
16	IH59, IH45	SH146, 45, 288, US59
17	ALL	ALL
18	ALL	ALL
19		
20		
21	IH610W, IH45	I10W, 35S
22	SH146, SH225, IH610N, IH45N	SH146, 610, IH45S
23	N/A	N/A
24	IH45	US59
25	SH225W, IH610N	IH10, US59S
26	NEVER LEAVE	NEVER LEAVE
27	IH610N, IH45, US59	US59, IH45, 610
28	SH 225, IH610, US59N	SH225, 610, US59S
29	?	SH225
30	IH45	288
31	SH225, IH610N	SH225, BW8, US59
32	IH610N, IH45	IH45, 610EN, 225E, 146ES
33	SH146, SH225, IH610W/N, IH45	SH146, SH225, US59
34	US59	US59
35	IH45	US59

COMPANY #	ROUTE TAKEN WHEN HEADED NORTH	ROUTE TAKEN WHEN HEADED SOUTH
36	IH610N	US59N
37		SH146, SH225
38		SH146, SH225
39	IH610N, IH45	SH146S, IH45S, IH610W, 288S
40	IH45	IH45, US59
41	?ALL	?ALL
42		SH146, SH225, IH610, IH10
43	IH610N, IH45	SH146, SH225, US59
44	SH225, IH610W, IH45	SH225, BW8, US59
45	SH146, SH225	SH146, SH225, BW8, US59
46	IH10, IH610W, IH45N	IH10, 610S, US59S
47	BW8, US59	IH10, IH610, TX3
48	SH146, SH225, IH610W/N, IH45	
49	SH146, SH225, IH610W/N, IH45	N/A
50	IH45	US59
51	IH610N	US59
52	N/A	N/A
53	IH45, US59	IH45, 288
54	US59N	US59S
55	SH225, IH610N, IH45	IH146, SH225, IH45, US59, 77, 281
56	IH610N, IH45	IH610S, US59, IH45
57	IH45N, US59N	IH45S, US59S
58	IH610, SH290N	IH610, US59
59	SH146, SH225, IH610S, IH45N	SH146S, FAIRMONT HWY, BW8, IH34
60	IH45, IH610, SH225, IH146	IH45, IH610, SH225
61		
62	SH146, SH225, IH45	SH146, SH225, SH35
63	N/A	IH45
64	SH146, SH225, IH6N, IH45	SH146, SH225, IH610W, US59
65	IH45	288, US59
66	IH45	IH45
67	SH146, SH225, IH610W/N, IH45	SH146, SH225, IH610, US59
68		
69	IH45	US59
70		
71		

COMPANY #	ROUTE TAKEN WHEN HEADED WEST	ROUTE TAKEN WHEN HEADED EAST
1	IH610W	IH10
2		
3	NONE	?
4	I10E	I59S
5	IH610W, 610N	IH10
6		
7	610N, IH10	SH146, IH10
8	SH146, SH225, 610N, IH10	SH146, IH10
9	IH10	IH10
10	N/A	N/A
11	IH10	IH10
12	IH10	IH10
13	IH10	IH10
14	SH146, SH225, IH610, IH10	SH146, BW8, IH10
15	SH146, SH225, 610N, IH10	SH146, BW8, IH10
16	IH10	IH10
17	ALL	ALL
18	ALL	ALL
19		
20		
21	IH10W	NO TRAVEL EAST
22		
23	N/A	N/A
24	IH10	IH10
25	IH10	IH10
26	N/A	N/A
27	IH10, 290, IH610	IH10, IH610
28	SH225, 610, IH10W	SH146, IH10E
29	IH10	IH10
30	IH10, 610, 290	IH10
31	SH225, 610N, IH10	IH10
32	IH610W, SH225, IH10	IH610, IH10, SH225
33	SH146, SH225, 610N, IH10	SH146, IH10
34	IH10	IH10
35	IH10	IH10

COMPANY #	ROUTE TAKEN WHEN HEADED WEST	ROUTE TAKEN WHEN HEADED EAST
36	IH10	IH10
37	IH10W	SH146, IH10
38	SH225, SH146	IH10
39	IH610, IH10W	IH610, IH10E
40	IH610S	IH10
41	?ALL	?ALL
42		
43	IH610N, IH10	SH146, IH10
44	SH225, IH610W, IH10, US290	SH146, IH10, BW8
45	SH146, SH225, IH610W/N, IH10	SH146, IH10
46	IH610N/W, IH10	IH10E
47	IH10	IH10
48	SH146, SH225, IH610W/N, IH10	
49	SH146, SH225, IH610W/N, IH10	SH146, IH10
50	IH10	IH10
51	IH610N	SH146, IH10
52	N/A	N/A
53	US290, IH10, US59	IH10
54	IH10W	IH10E
55	SH146, SH225, IH146N, IH10	SH146, SH225, IH610N, IH10, US59, 20
56	IH610W, IH10, SH290	IH610, IH10
57	SH225, IH610, SH290, IH10	IH10
58	IH610, IH10	IH610, IH10
59	SH146, SH225, IH610S, IH10W	SH146, IH10
60	IH10, IH610, SH225, IH146	IH10, IH610, SH225, SH146
61		
62	SH146, SH225, IH45, IH10	SH146, IH10
63	IH10, IH610	SH146, IH10
64	SH146, SH225, IH610W, IH10	SH146, IH10
65	IH10	SH146, IH10
66	IH10	IH10
67	SH146, SH225, IH610W/N, IH10	SH146, IH10
68		
69	IH10	IH10
70		
71		

ADDITIONAL COMMENTS

Do you think the additional hours (open an hour earlier and open during the lunch hour) have had a significant impact on your productivity?

 # 1 BLANK
 # 2 BLANK
 # 3 YES
 # 4 BLANK
 # 5 NO
 # 6 YES
 # 7 BLANK
 # 8 YES
 # 9 NO
 # 1 1 YES
 # 1 2 YES
 # 1 3 YES
 # 1 4 NO
 # 1 5 NO
 # 1 6 MARGINAL
 # 1 7 A LITTLE
 # 1 8 NO, IT IS STILL TOO BUSY
 # 1 9 BLANK
 # 2 0 BLANK
 # 2 1 YES
 # 2 2 BLANK
 # 2 3 YES
 # 2 4 YES
 # 2 5 IT WOULD HAVE A VERY DEFINITE IMPROVEMENT ON PRODUCTIVITY FOR ME AND ALL CONCERNED.
 # 2 6 YES
 # 2 7 YES
 # 2 8 NO
#29 YES
 # 3 0 YES, LUNCH HOUR ONE HOUR LATER
 # 3 1 YES
 # 3 2 IT IS THE BEST THEY CAN DO FOR TRANSPORTATION MOVEMENT.
 # 3 3 YES
 # 3 4 YES
 # 3 5 YES, WOULD CUT A LOT OF DOWN TIME OUT.
#36 YES
 # 3 7 YES
 # 3 8 YES
 # 3 9 YES, TIME LOST IN WAITING LINES IS MONEY LOST FOR NECESSARY REPAIRS THE D.O.T. REQUIRES FOR SAFE OPERATION.
 # 4 0 YES
 # 4 1 YES, HAS HELP A LOT

ADDITIONAL COMMENTS CONT.

Do you think the additional hours (open an hour earlier and open during the lunch hour) have had a significant impact on your productivity?

#42 YES
#43 YES
#44 NO, THE WAY OUT-BOUND LAND CLOSING CHANGED RESULTED IN THE SAME DELAYS OR WORSE.
#45 YES
#46 BLANK
#47 YES, IF WE HAD AN EARLIER START WE COULD MISS HEAVY TRAFFIC. LUNCH HELPS KEEP MOVING LINES AND A 5:00 A.M. TO 7:00P.M. WOULD PREVAIL.
#48 YES, THE LUNCH HOUR IS VERY IMPORTANT, OPEN EARLY HELPS.
#49 YES
#50 YES/NO, BECAUSE THEY HAVE A SKELETON CUT IN 1/2 CREW WORKING.
#51 YES, DEFINITELY AN HOUR CAN MEAN A BIG DIFFERENCE IN INCOME FOR AN OWNER OPERATORS DAY. AS IT IS TRUCKERS ARE NOT PAID ENOUGH FOR THEIR SERVICES.
#52 YES
#53 NO
#54 YES
#55 YES
#56 YES
#57 SOME
#58 YES--IT HAS HELPED
#59 YES
#60 (CHECK MARK)
#61 NO
#62 YES
#63 SEEMS TO HAVE HELPED
#64 VERY MUCH SO
#65 LUNCH HELPS
#66 NO, BECAUSE THERE IS NO ONE TO UNLOAD YOU.
#67 YES
#68 YES, NEED MORE HOURS
#69 BLANK
#70 BLANK
#71 A DRIVER SHOULD NOT HAVE TO WAIT TO DOLLY DOWN OR WAIT ON LOAD WHILE SHIP IS UNLOADING

ADDITIONAL COMMENTS CONT.

Why do you think the Barbours Cut Terminal Container Inquiry System is hardly being used at all? (This is the system where you or your dispatcher can call the terminal computer and get the status (cleared or not cleared for release) on any container in the terminal before you arrive at the port).

 # 1 BLANK
 # 2 BLANK
 # 3 DONT KNOW
 # 4 BLANK
 # 5 BECAUSE WE ALWAYS GET STUCK REGARDLESS
 # 6 ?
 # 7 BLANK
 # 8 ?
 # 9 BLANK
 # 1 0 BLANK
 # 1 1 TOO BUSY
 # 1 2 DISPATCHER DOES NOT HAVE THE TIME AND DOES NOT WANT TO USE IT.
 # 1 3 CALL THE PORT TERMINAL
 # 1 4 YES
 # 1 5 YES
 # 1 6 DISPATCHERS ARE NOT MADE TO USE IT
#17 DELAYS
 # 1 8 WE USE IT ALL OF THE TIME
#19 BLANK
 # 2 0 BLANK
 # 2 1 STEAMSHIP LINES USUALLY SAY SHIPMENT READY TO GO
 # 2 2 BLANK
 # 2 3 I USE IT VERY OFTEN. IT WORKS FOR ME.
 # 2 4 BLANK
 # 2 5 I WOULD LIKE TO OBTAIN THIS INFORMATION BEFORE I ARRIVE AND IF MY DISPATCHER DOES NOT CALL I WOULD LIKE TO DO IT MYSELF BUT I NEED THE PHONE NUMBER TO CALL.
 # 2 6 I FEEL IT IS THE DISPATCHERS JOB TO DO THIS BEFORE HE GIVES ME THE LOAD BUT SOMETIMES THEY DO NOT.
 # 2 7 DON'T KNOW**#28** GOOD
 # 2 9 NO
 # 3 0 WE GET CONFUSED SIGNALS, COME TO GET AND IS ON HOLD.
#31 WE USE IT.
 # 3 2 DEPENDS, BORING IS A PROBLEM.
 # 3 3 PROBABLY BECAUSE THE DISPATCHER DOES NOT WANT TO BE BOTHERED.
 # 3 4 NOT MADE AVAILABLE TO DRIVERS.
 # 3 5 DID NOT KNOW IT EXISTED.
 # 3 6 BLANK
 # 3 7 NOT BEING USED ENOUGH BY TRUCK DISPATCHERS, THUS CAUSING DRIVERS LONGER DELAYS IN PICKUPS AND DELIVERIES.
 # 3 8 BLANK

ADDITIONAL COMMENTS CONT.

Why do you think the Barbours Cut Terminal Container Inquiry System is hardly being used at all? (This is the system where you or your dispatcher can call the terminal computer and get the status (cleared or not cleared for release) on any container in the terminal before you arrive at the port).

#39 I DON'T KNOW IF IT IS BEING USED OR NOT, AND IF NOT, I SUSPECT THE RIGHT PEOPLE OR ATTITUDE IS BEING USED.
#40 WAS NOT AWARE OF THE SYSTEM.
#41 DEPENDS TOO MUCH ON DISPATCHER.
#42 I DON'T KNOW
#43 BLANK
#44 DISPATCHERS NOT ADVISING DRIVERS AS TO THE BENEFIT OF THIS SYSTEM. DRIVER IGNORANCE TO THE MECHANICS OF THE SYSTEM.
#45 NO
#46 BLANK
#47 I DON'T USE THE SYSTEM. I DON'T THINK MY DISPATCHER USES IT EITHER. HE IS IN TOUCH WITH STEAMSHIP LINES. PORT PERSONNEL ARE DOING THEIR JOB. CHECK IT OUT.
#48 NOT ADVERTISED.
#49 NO
#50 BECAUSE THE DISPATCHERS ARE TOO BUSY TO CALL AND CHECK . AS A DRIVER, I DON'T FEEL LIKE IT IS MY RESPONSIBILITY.
#51 DON'T KNOW. I DIDN'T KNOW THEY HAD ONE.
#52 DON'T KNOW.
#53 DON'T KNOW.
#54 SOMEBODY IS NOT DOING THEIR JOB.
#55 ALWAYS REJECTED
#56 NOT USED
#57 ?
#58 NOT ENOUGH BY DISPATCH
#59 LAZY MANAGEMENT AT COMPANY, NO CONCERN FOR DRIVER DELAYS. LAZY EMPLOYEES AT S.S. CO., NO CONCERN FOR DRIVER DELAYS. DRIVERS UNAWARE OF SIMPLICITY OF SYSTEM. ADVERTISE!
#60 DOES NOT MAKE ANY DIFFERENCE, I HAVE TO COME OVER TO GET IT RELEASED OR NOT.
#61 BLANK
#62 DON'T KNOW
#63 DISPATCHER RELIES ON THE WORD OF SS COMPANIES.
#64 I THOUGHT DRIVERS WERE USING IT FREQUENTLY. BUT DISPATCHERS ARE LEAVING IT UP TO THE BROKERS INSTEAD OF MAKING THE EXTRA CALL. IT HAS BEEN EXTREMELY HELPFUL IN MY CASE.
#65 MANY TIMES IT IS USED TO NWOCC AND SHIP LINES. MAKE MANY MISTAKES LEAVING DELAY IN PAPER WORK PART ALSO MAKE A LOT OF MISTAKES ON HAZARDOUS MATERIAL.
#66 BLANK
#67 DON'T KNOW

ADDITIONAL COMMENTS CONT.

Why do you think the Barbours Cut Terminal Container Inquiry System is hardly being used at all? (This is the system where you or your dispatcher can call the terminal computer and get the status (cleared or not cleared for release) on any container in the terminal before you arrive at the port).

#68 YES
#69 BLANK
#70 BLANK
#71 THE WEIGHT IS TOO HEAVY--RIDICULOUS. THEY SHOULD UNLOAD HEAVY LOADS AT THE PORT BEFORE DELIVERING THEM TO CUSTOMER.

Do you have any realistic recommendations for the dept. of transportation on how to make your trips to and from the port any easier?

 # 1 BLANK
 # 2 BLANK
 # 3 NO
 # 4 BLANK
 # 5 NO
 # 6 BLANK
 # 7 BLANK
 # 8 ?
 # 9 BLANK
#10 BLANK
#11 BLANK
#12 NO
#13 BLANK
#14 DONT KNOW
#15 DONT KNOW
#16 ELIMINATE PORT SPEED TRAP --B. CUT BLVD.
#17 BLANK
#18 NO
#19 BLANK
#20 BLANK
#21 BLANK
#22 BLANK
#23 THEY NEED TO FINISH HWY. 225 FROM MILLER CUT OFF TO HWY. 146.
#24 BLANK
#25 BLANK
#26 NO
#27 BLANK
#28 NO

ADDITIONAL COMMENTS CONT.

Do you have any realistic recommendations for the dept. of transportation on how to make your trips to and from the port any easier?

#29 NO
#30 STAY OUT OF OUR SIGHT
#31 NO
#32 I THINK IF WE CAN DO BETTER. IS TIME TO SEE IF THIS IS AMERICA. EFFICIENT.
#33 MANY TIMES THE BROKER FAILS TO PUT THE BK# IN THE COMPUTER AN THAT USUALLY WILL TAKE 30-45 MINUTES TO CLEAN UP.
#34 PORT PAV DAMAGE TO TRUCKS AFTER 2 HOURS AND REQUIRE THAT PORT MACHINE OPERATORS DO NOT TEAR UP OUR EQUIPMENT AND HOLD THEM FINANCIALLY RESPONSIBLE IF THEY DO.
#35 FINISH THE BRIDGE BY THE TUNNEL
#36 NO
#37 FINISH 146 AND SHIP CHANNEL BRIDGE
#38 BLANK
#39 THE D.O.T. SHOULD MAKE MORE INSPECTIONS AT THE CONTAINER YARDS AND DEADLINE A LOT OF EQUIPMENT WE MUST USE--ROTTEN TIRES UNSEEN ON THE INSIDE FOR ONE. GET ON THESE STEAMSHIP LINES WHOSE EQUIPMENT IS IN POOR CONDITION.
#40 NO
#41 BLANK
#42 NO
#43 BLANK
#44 ENCOURAGE THE CITIES OF MONGAND POINT AND LAPONTE TO ADJUST THE RADAR TRAP SPEED LIMITS ON BARBOURS CUT BLVD. --THESE ARE UNJUSTIFIED SPEED LIMITATIONS.
#45 I VERY SELDOM PULL CONTAINERS FROM THE PORT.
#46 BLANK
#47 SMOOTHER ROADS. EDUCATE THE PEOPLE OF TRUCKERS HAZARDS SUCH AS PULLING IN FRONT OF ME AND STOPPING , TURN LIGHTS ON WHILE RAINING.
#48 MARK THE ROUTE BETTER FOR FIRST- TIME AND OUT OF TOWN DRIVERS.
#49 DO NOT GO TO ?
#50 NO
#51 THE ROADS ARE REALLY ROUGH ON 225 GOING EAST, ESPECIALLY TOWARDS THE END.
#52 BLANK
#53 NO
#54 I THINK THEY SHOULD DO ROAD CONSTRUCTION AT NIGHT NOT DURING THE DAY.
#55 NO
#56 NO
#57 NO
#58 NO, A GOOD JOB IS BEING DONE ON 225.

ADDITIONAL COMMENTS CONT.

Do you have any realistic recommendations for the dept. of transportation on how to make your trips to and from the port any easier?

#59 YOU MUST STOP THE UNQUALIFIED DRIVERS AND TRUCKS FROM USING THE PORT. ADD MORE AND LARGER SIGNS. POST LARGER WARNING (NB 146) OF LOW BRIDGE!
#60 NONE
#61 BLANK
#62 NO
#63 BETTER ROADS
#64 DURING FLEX TIMES THE OUTBOUND TENDS TO GET CONGESTED WHEN THERE IS ONLY ONE CLERK SURVEYING. IF SWING AUTHORIZATIONS COULD BE SENT WITH TIR'S IN WOULD SAVE A LOT OF TIME AND ENERGY.
#65 BLANK
#66 RAISE THE SPEED LIMIT
#67 NO
#68 BLANK
#68 BLANK
#70 BLANK
#71 THE RATES STINK. THEY TELL THE POOR OWNER/OPERATOR HE GETS 70% AND THAT IS A LIE. THE DRIVER GETS 30% AND THE COMPANY STEALS THE REST. THIS IS THE REASON THAT WE CANNOT KEEP OUR EQUIPMENT UP TO DATE.

Any overall comments on how to make your job easier and how to help make your port assignments more productive?

#1 BLANK
#2 BLANK
#3 NO
#4 BLANK
#5 DEREGULATE TRUCKING AND LET THE TRUCKERS DO THE TRUCK DRIVING.
#6 BETTER CRANE SERVICE
#7 BLANK
#8 ?
#9 BLANK
#10 BLANK
#11 BLANK
#12 NONE
#13 COMMUNICATION
#14 BLANK
#15 BLANK

Any overall comments on how to make your job easier and how to help make your port assignments more productive?

#16 ASSIGN MORE PORT HELP IN INSPECTION AREAS AND CONTAINER HANDLING AREAS.

#17 GET YOUR PEOPLE TO DO THEIR JOB BETTER, NOT TAKE THEIR SWEET TIME.

#18 STAY OPEN LATER AND HAVE FAIRWAYS AND STRACHNS CONTAINER YARDS STAY LATER AND OPEN DURING LUNCH.

#19 BLANK

#20 BLANK

#21 I KNOW SOME DRIVERS HAVE A BAD ATTITUDE, BUT SO DO SOME PORT EMPLOYEES. SOME PEOPLE SAY THAT TRUCK DRIVERS ARE STUPID, BUT THEY DON'T REALIZE THAT IF IT WASN'T FOR DRIVERS THEY WOULDN'T HAVE A JOB.

#22 BLANK

#23 I HAVE BIG PROBLEMS WHEN THE LOADING CRANES ARE WORKING SHIPS,THERE'S NOT ENOUGH CRANES TO WORK THE TRUCKS WHEN THIS HAPPENS. IT MAY ADD ON EXTRA HOURS TO THE NORMAL WAITING TIME TO GET OUT.

#24 BLANK

#25 WHEN GOING TO BARBOURS CUT I SOMETIMES NEED TO ASK QUESTIONS IN REGARDS TO THE AREAS OR PROCESS IN WHICH TO LEAVE OR PICK UP A CONTAINER OR LOAD. THE PEOPLE HERE ARE VERY RUDE ABOUT GIVING YOU ANSWERS OR SOMETIMES COMPLETELY IGNORE YOU.

#26 TOO MANY REJECTS. WHEN REJECTED YOU HAVE TO DRIVE ALL AROUND THE CUT.

#27 NO

#28 NONE

#29 NO

#30 LOADS ARE PUT ON CHASSIS WHICH ARE BROKEN, KEEP GOOD EQUIPMENT SEPARATE FROM BAD EQUIPMENT. MAKE SURE SLIDER CHASSIS ARE PROPERLY ADJUSTED BEFORE PUTTING CONTAINERS ON IT.

#31 BLANK

#32 INFORMATION IN PAPERWORK IS THE REASON FOR LOST TIME (BORING). PEOPLE IN THE PORT OF HOUSTON IS GOOD, BUT THEY COULD DO BETTER IF THEY WISHED.

#33 BLANK

#34 POST REVENUE ON INTERCHANGE SO YOU CAN SEE WHO IS

#35 HAVE MORE INFORMATION FOR A FIRST TIME DRIVER. GET THE PEOPLE TO BE A LITTLE MORE FRIENDLY WHEN YOU HAVE A PROBLEM. MORE DIRECTION SIGNS ONCE YOU ENTER THE PORT AREA.

#36 BLANK

#37 USE MORE OF THE OVER HEAD LIFT CRANKS INSTEAD OF PARKING THEM AT END OF PADS.

#38 BLANK

ADDITIONAL COMMENTS CONT.

Any overall comments on how to make your job easier and how to help make your port assignments more productive?

#39 THE REASON MY JOB IS UNPRODUCTIVE COULD BE THE DEREGULATION AND STAB-IN-THE-BACK CAMPAIGN THESE TRUCKING COMPANIES MUST USE. WE NEED TO BE MORE REGULATED WITH POSSIBLY HIGHER TARIFFS IF NOT JUST THE ACROSS THE BOARD RATES. THE TIME AND MONEY PROBLEM IS THE REASON MOST OF THE DRIVERS AND TRIPS OF THE CONTAINER FREIGHT SYSTEMS IS NOT GETTING EASIER AND MORE PRODUCTIVE. AN ATTITUDE OF ME FIRST AND THE HELL WITH YOU IS MOST COMMONPLACE OUT HERE BECAUSE OF RATES AND TIME.

#40 I HAUL ONLY LOADED ISO TANKS TO THE PORT AND PICK UP ONLY EMPTY ISO TANKS. THE MAJOR PROBLEM I HAVE IS WAITING FOR CONT. TO BE SWUNG BECAUSE EVERYTHING I HAUL IS IMCO 4.2 CLASS. THEY ARE ALREADY ON LINE CHASSIS PARKED IN C-2. I HAVE SIX OF MY OWN CHASSIS, THEREFORE THEY HAVE TO SWING CONT. EITHER OFF OR ON.

#41 BLANK

#42 BE MORE HELPFUL TO THE NEW PERSON, TRY TO UNDERSTAND THEY DO NOT KNOW WHAT THEY ARE DOING.

#43 BLANK

#44 PHA NEEDS TO RETHINK THE CURRENT SYSTEM OF ROUTING ARRIVALS OR DELIVERIES OF PICKUPS. THERE IS ENTIRELY TOO MUCH REDUNDANCY IN THE WAY THE SYSTEM IS CURRENTLY BEING UTILIZED. GATES/PERSONNEL ARE NOT BEING UTILIZED TO THEIR RESPECTIVE POTENTIAL. LOCATIONS FOR PICK UP AND DELIVERIES FOR VARIOUS LINES ARE CONSTANTLY BEING CHANGED AND THERE IS NO POSTED OR WRITTEN NOTIFICATION OF THE CHANGES BY ANYONE. WHY ARE CHANGES BY THE TRUCK LINES IN A TIMELY MANNER. THE OVERALL CONDITION OF CHASSIS EQUIPMENT BY THE MAJORITY OF THE STEAM SHIP LINES (WITH A FEW EXCEPTIONS) IS VERY POOR. IF THE D.O.T. REGULATIONS WERE STRICTLY ENFORCED, 80% OR MORE OF THE AVAILABLE CHASSIS EQUIPMENT WOULD NOT BE ALLOWED BLANK TO LEAVE THE PREMISES, LET ALONE BE OPERATIVE ON STATE/INTERSTATE ROADWAYS.

#45 NO

#46 **#47** MORE HOURS OPEN EARLY MORNING, 7 A.M. IS NOT EARLY. MAYBE 5 A.M. TO 7 P.M. I HAVE PROBLEM WITH MY BOOK NUMBER. I THINK THAT IT IS MY DISPATCH NOT THE PORT PERSONNEL. MAYBE PAINT ISLE LETTERS AT EACH ISLE (ABCD) IN C2C4 AND C5.

#48 CONTINUE TO WORK DAILY TO IMPROVE SERVICE!

#49 BLANK

#50 NO

#51 SOME OF THE LIGHTS ON 225 DON'T STAY GREEN LONG ENOUGH BEFORE YOU CAN GET GOING AGAIN THE LIGHT HAS ALREADY CHANGED.

#52 MORE OVERHEAD CRANES TO LOAD CONTAINERS

Any overall comments on how to make your job easier and how to help make your port assignments more productive?

#53 NO

#54 THE PORT HAS SOME PEOPLE THAT DON'T TAKE THEIR JOB SERIOUSLY ENOUGH (THEY THINK THEY'RE BETTER THAN WE ARE AND THAT WE OWE THEM SOMETHING)

#55 MORE COOPERATION

#56 NO

#57 BE OPEN AT NIGHT

#58 POSTED RATES ON ALL MOVES. I THINK THE DRIVER GETS TOLD AN UNTRUE RATE OFTEN. I THINK TOO MANY DRIVERS ARE PAID BY THE PERCENTAGE RATE SO IT CAUSES UNNEEDED RISKS BY DRIVERS TO SPEED, TURN CORNERS TOO FAST, ETC. THERE IS NO MIN. AMOUNT OF PAY. A MAN MAY MAKE AS LOW AS $11 TO GO TO THE PORT, MEN NEED A MIN. TO WORK BY.

#59 POHA NEEDS STAFF AND EQUIPMENT TO HANDLE PEAK LOADS, NOT BE GEARED TO BELOW AVERAGE LOADS. "LOADS"= QUANTITY OF TRUCKS/ GIVEN DAY ETC.

#60 HAND WRITTEN INTERCHANGE, COMPUTER IS GOOD FOR THE PORT ONLY, IT TAKES TOO LONG TO MAKE ONE AND IT TAKES TWO PEOPLE DOING A LOT OF WORK.

#61 BLANK

#62 THE MAIN PROBLEM WITH THE PORT OPERATION IS FINDING A SUITABLE CHASSIS. THE CHASSIS SITUATION IS BAD.

#63 IT IS TOO SCREWED UP TO BE FIXED, THERE IS TOO MUCH RED TAPE ABOUT WHICH GATE TO EXIT--TOO MUCH TIME HAVING TO BE SPENT WAITING FOR PAPERWORK. IT WOULD HELP TO HAVE EQUIPMENT IN ROAD CONDITION TO KEEP FROM HAVING TO WAIT FOR REPAIRS TO GET OUT.

#64 I THINK IF THERE IS A WAY TO CALL OUT EXTRA CLERKS AND CRANE OPERATORS DURING THE DAY AS TRAFFIC DEMANDS IT. THIS ISSUE SHOULD BE LOOKED AT, OTHERWISE THE PORT HAS REDUCED TIMES INSIDE THE TERMINAL BY 30-40%.

#65 START A REJECT LINE AT SCALES SO YOU DON'T HAVE TO WAIT IN LINE AGAIN TO GET YOUR PAPERWORK AFTER THE CORRECTIONS.

#66 EMPLOYEES LEAVE BAD ATTITUDE AT HOME.

#67 NO

#68 BLANK

#69 BLANK

#70 BLANK

#71 IF WE GET PAID RIGHT EVERYTHING WOULD FALL INTO PLACE. A LOT OF TAX MONEY IS BEING LOST THE WAY THESE COMPANIES ARE STEALING FROM THE DRIVERS. PLEASE CHECK THIS INFORMATION OUT.

APPENDIX C

BARBOURS CUT TRANSACTION REQUEST

TRANSACTION REQUEST

LT-002

Barbours Cut Terminal

Interchange # _____

Complete Separate Request for each Type of Movement

Date _____

INBOUND

☐ Export Load IN . . . . . Length_____

☐ Dropping Chassis . . . . . Length_____

☐ Empty Container IN . . . . . Length_____

Booking No. _____

Ship Line _____

Ship Name _____

Container No. _____

Chassis No. _____

Seal No. _____

Commodity _____

Shipper _____

Port of Discharge _____

Net Weight of Commodity _____

Yes No Yes No
Hazardous ☐ ☐ Placards ☐ ☐

Circle Hazardous Code (If Hazardous)

1 2 3 4 5 6 7 8 9

SCAC / Truck Line Code / _____

License No. _____

DRIVER'S SIGNATURE:

_____

Yes No Yes No
Over Height ☐ ☐ Over Width ☐ ☐
Yes No
Over Length ☐ ☐

Box Type_____ Chassis Type_____

PHA CLERK'S SIGNATURE:

_____

OUTBOUND

☐ Import Load OUT

☐ New Chassis OUT . . . . . Length_____

☐ Empty Container OUT . . . . . Length_____

Container No. _____

Chassis No. _____

B/L, REL., or BKng. # _____

Ship Line _____

Ship Name _____

SCAC / Truck Line Code / _____

License No. _____

DRIVER'S SIGNATURE:

_____

PHA CLERK'S SIGNATURE:

_____

Box Tare _____

Chassis Tare _____

MGW _____

Yes No Yes No
Slider ☐ ☐ Engaged ☐ ☐

Truck Weight_____

APPENDIX D

BARBOURS CUT EQUIPMENT INTERCHANGE RECEIPTS FOR THREE SEPARATE TYPES OF TRANSACTIONS

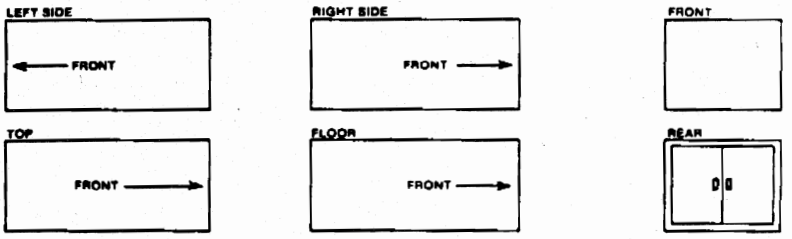
PORT OF HOUSTON AUTHORITY

900507

EQUIPMENT INTERCHANGE RECEIPT

EQUIPMENT CONDITION & INSPECTION REPORT

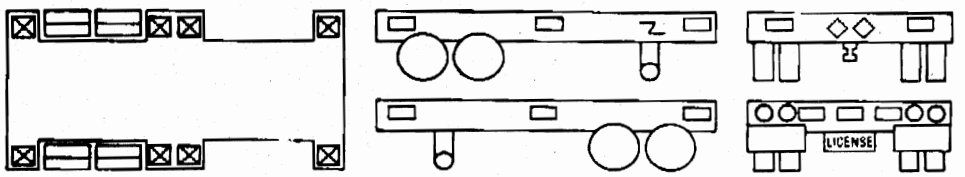
PLEASE MARK CLEARLY ALL DAMAGES AND DEFICIENCIES. IF NO EXCEPTIONS, USE CHECK MARK. THE FOLLOWING SYMBOLS MAY BE USED: C—CUT; B—BRUISE; H—HOLE; M—MISSING; BR—BROKEN; D—DENT; R—REPAIRED. CIRCLE ALL EXCEPTIONS REQUIRING REPAIRS.



	SHIPPERS SEAL INTACT YES/NO	CUSTOMS SEAL INTACT YES/NO
CONTAINER NOT ACCEPTED		REMARKS
REPAIRS REQUIRED		
CLEANING REQUIRED		
T. I. R. CERT. MISSING		
CONTAINER SERVICEABLE		
CONTAINER UNSERVICEABLE		
CHECK AS APPLICABLE		GENERATOR SET NO.

IF NOT DEFECTIVE, USE CHECK MARK. IF DEFECTIVE, MARK CLEARLY

☒ TWIST LOCK ▭ CLEARANCE LIGHT ○ STOP & TAIL LIGHT ◇ AIR & ELECTRICAL CONNECTION



DATE	TIME		LOCATION
VESSEL			CHAS LOC
UNIT		TYPE	BX TARE
MOVE RECEIVE FCL		ROUTE	OVERALL
VEHICLE		VOYAGE	TRACTOR
SEAL		BOOKING	CH. TARE
DEST		ULT. DEST	MGW
SHIPPER		CHASSIS	
REMARKS			

RECEIPT RECORDED BY _____

FOR POHA ON BEHALF OF _____ FOR _____

STOMS ENTRY NO. _____

ORT AUTHORITY) THIS CONTAINER WAS RE-IVED/DELIVERED IN GOOD ORDER AND CON-TION, EXCEPT AS NOTED ABOVE

RELEASED BY _____ U.S CUSTOMS DATE _____

(CARRIER) THIS CONTAINER WAS RECEIVED/DELIVERED IN GOOD ORDER AND CONDITION, EXCEPT AS NOTED ABOVE.

BY _____ DATE _____

_____ DATE _____ BY RELEASED BY S.S. CO. DATE _____

1-PORT COPY

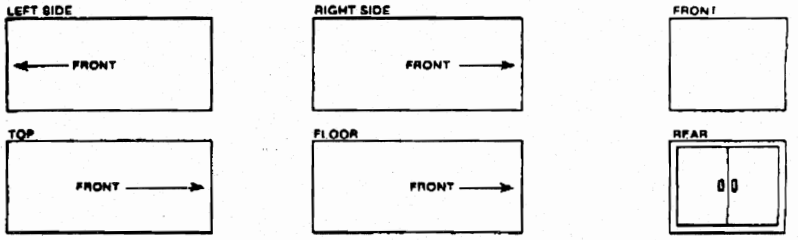
003

05/10/94 15:54

'ORT OF HOUSTON AUTHORITY 90531(
QUIPMENT INTERCHANGE RECEIPT

EQUIPMENT CONDITION & INSPECTION REPORT

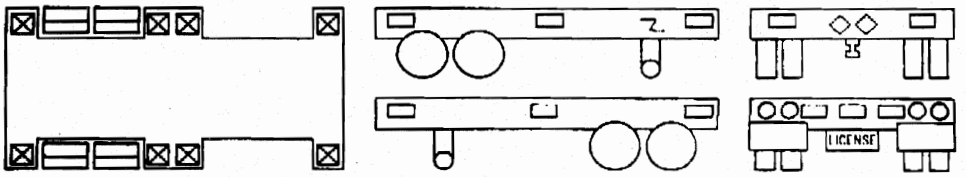
PLEASE MARK CLEARLY ALL DAMAGES AND DEFICIENCIES. IF NO EXCEPTIONS, USE CHECK MARK. THE FOLLOWING SYMBOLS MAY BE USED: C—CUT; B—BRUISE; H—HOLE; M—MISSING; BR—BROKEN; D—DENT; R—REPAIRED. CIRCLE ALL EXCEPTIONS REQUIRING REPAIRS.



		SHIPPERS SEAL INTACT YES/NO — CUSTOMS SEAL INTACT YES/NO
CONTAINER NOT ACCEPTED		REMARKS
REPAIRS REQUIRED		
CLEANING REQUIRED		
T. I. R. CERT. MISSING		
CONTAINER SERVICEABLE		
CONTAINER UNSERVICEABLE		
CHECK AS APPLICABLE		GENERATOR SET NO

IF NOT DEFECTIVE, USE CHECK MARK. IF DEFECTIVE, MARK CLEARLY

☒ TWIST LOCK ▭ CLEARANCE LIGHT ○ STOP & TAIL LIGHT ◇ AIR & ELECTRICAL CONNECTION



LOCATION

DATE TIME
UNIT TYPE
RECEIVE EMPTY
CHASSIS
VEHICLE
CONSIGNOR
REMARKS
RECEIPT RECORDED BY _____
FOR POHA ON BEHALF OF _____ FOR _____

JSTOMS ENTRY NO _____

ORT AUTHORITY) THIS CONTAINER WAS RE... IVED/DELIVERED IN GOOD ORDER AND CON TION, EXCEPT AS NOTED ABOVE

RELEASED BY _____ U.S. CUSTOMS DATE _____

(CARRIER) THIS CONTAINER WAS RECEIVED/ DELIVERED IN GOOD ORDER AND CONDITION EXCEPT AS NOTED ABOVE

_____ BY _____ DATE _____

_____ DATE _____ BY RELEASED BY S.S. CO. DATE _____

1 - PORT COPY

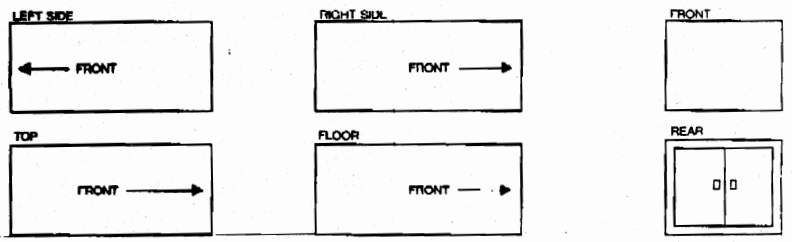
200 15:54 05/10/94

PORT OF HOUSTON AUTHORITY
EQUIPMENT INTERCHANGE RECEIPT

001C

EQUIPMENT CONDITION & INSPECTION REPORT

PLEASE MARK CLEARLY ALL DAMAGES AND DEFICIENCIES. IF NO EXCEPTIONS, USE CHECK MARK. THE FOLLOWING SYMBOLS MAY BE USED: C—CUT; B—BRUISE; H—HOLE; M—MISSING; BR—BROKEN; D—DENT; R—REPAIRED. CIRCLE ALL EXCEPTIONS REQUIRING REPAIRS.



CONTAINER NOT ACCEPTED	
REPAIRS REQUIRED	
CLEANING REQUIRED	
T.I.R. CERT. MISSING	
CONTAINER SERVICEABLE	
CONTAINER UNSERVICEABLE	
CHECK AS APPLICABLE	

SHIPPERS SEAL INTACT YES/NO

CUSTOMS SEAL INTACT YES/NO

REMARKS

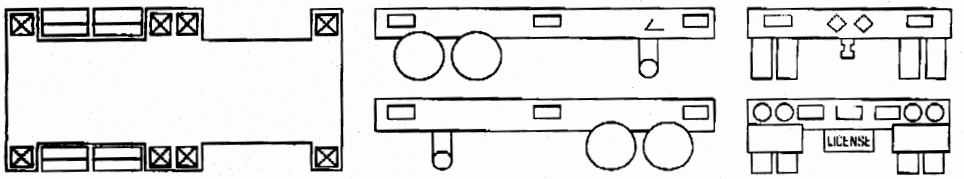
GSC _____ Lic Exp _____

MGW _____ M/M Tires _____

GENERATOR SET NO.

IF NOT DEFECTIVE, USE CHECK MARK. IF DEFECTIVE, MARK CLEARLY

☒ TWIST LOCK ▭ CLEARANCE LIGHT ○ STOP & TAIL LIGHT ◇ AIR & ELECTRICAL CONNECTION



☐ Box ONLY
☐ Both Box & Chas

Date _____ Time _____ Location _____

Vessel _____

Unit _____ Type _____

Move Delivery FCL _____ Route _____

Vehicle _____ Voyage _____

Dest _____ D/O _____

Consignee _____ Chassis _____

Remarks _____ Seal # _____

Delivery Recorded by _____ Cargo _____

for PORTA on behalf of _____ for _____

USTOMS ENTRY NO. _____

RELEASED BY _____ U.S. CUSTOMS DATE _____

ORT AUTHORITY) THIS CONTAINER WAS RE-EIVED/DELIVERED IN GOOD ORDER AND CON-TION, EXCEPT AS NOTED ABOVE.

(CARRIER) THIS CONTAINER WAS RECEIVED/ DELIVERED IN GOOD ORDER AND CONDITION EXCEPT AS NOTED ABOVE.

BY _____ DATE _____

_____ DATE _____

BY _____ RELEASED BY S.S. CO DATE _____

1-PORT COPY

APPENDIX E

STEVEDORING SERVICES OF AMERICA
EQUIPMENT INTERCHANGE REPORT

STEVEDORING SERVICES OF AMERICA

EQUIPMENT INTERCHANGE AND INSPECTION REPORT

WHETHER OR NOT A SEPARATE EQUIPMENT INTERCHANGE CONTRACT HAS BEEN EXECUTED BETWEEN THE OCEAN CARRIER AND THE MOTOR CARRIER THE LATTER EXPRESSLY AGREES TO BE BOUND BY THE TERMS AND CONDITIONS SET FORTH IN OCEAN CARRIERS STANDARD EQUIPMENT INTERCHANGE CONTRACT AND ACKNOWLEDGES THIS FACT BY SIGNING THIS INSPECTION/RECEIPT FORM.

STEAMSHIP LINE	DATE / TIME	PLACE OF INTERCHANGE	FULL	IN
			EMPTY	OUT

CONTAINER NUMBER	CHASSIS NUMBER	CY	DT	CFS

CARRIER INFORMATION

TRUCK COMPANY	TRUCK #	TRUCK LIC.# / STATE	S.S.A. I.D. #

CONTAINER INFORMATION

TYPE		SIZE		HT.	
SEAL NUMBER				TARE WEIGHT	

CARGO INFORMATION

VESSEL/VOYAGE	BOOKING NUMBER	DISCH. PORT	FINAL DEST.

COMMODITY	GROSS WEIGHT (KT)	YARD LOCATION	HAZARD CLASS

REEFER INFORMATION

BOOKED TEMPERATURE		SET TEMPERATURE	TEMPERATURE READING
VENT POSITION OPEN	CLOSED	M.G. SET/GEN. NUMBER	CLIP ON NUMBER

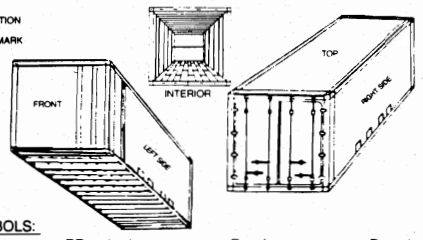
CHASSIS INFORMATION

LICENSE NUMBER/STATE	YARD LOCATION	RETURN TO:

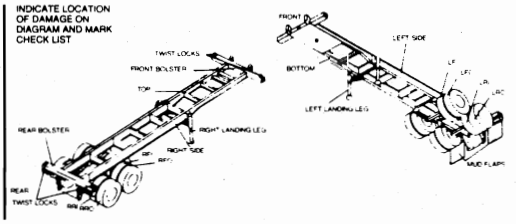
REMARKS:

THE EQUIPMENT INTERCHANGED IN GOOD CONDITION EXCEPT AS NOTED GOOD ☐ DAMAGED ☐

INDICATE LOCATION OF DAMAGE ON DIAGRAM AND MARK CHECK LIST



INDICATE LOCATION OF DAMAGE ON DIAGRAM AND MARK CHECK LIST



USE SYMBOLS:

BR — broken B — bent D — dent H — hole M — missing NV — no view

I HEREBY CERTIFY THAT ON THE DATE STATED FIRST ABOVE, I CAREFULLY INSPECTED THE EQUIPMENT DESCRIBED ABOVE. THAT THIS IS A TRUE AND CORRECT REPORT OF THE RESULTS OF SUCH INSPECTION, AND THAT POSSESSION OF SUCH EQUIPMENT WAS TAKEN ON BEHALF OF THE CARRIER OR STATED STEAMSHIP CO. AT THE PLACE AND DATE INDICATED.

TERMINAL SAFETY RULES: 1. OBEY SPEED LIMIT AND STOP SIGNS. 2. TERMINAL EQUIPMENT HAS RIGHT OF WAY. 3. DRIVERS MUST REMAIN INSIDE THEIR VEHICLE WHILE IN YARD. 4. ABSOLUTELY NO PASSENGERS ALLOWED IN TRUCK. 5. IF YOU EXPERIENCE ANY PROBLEMS, SEE A SUPERVISOR.

THIS EQUIPMENT WAS RECEIVED/DELIVERED IN GOOD CONDITION EXCEPT AS NOTED ABOVE	THIS EQUIPMENT WAS RECEIVED/DELIVERED IN GOOD CONDITION EXCEPT AS NOTED ABOVE
BY:	BY:
CLERK'S SIGNATURE	DRAYMAN'S SIGNATURE

APPENDIX F

SEA-LAND SERVICE, INC.
TRAILER INTERCHANGE RECEIPT
(Equipment Interchange Receipt)

DI17844

SEA-LAND SERVICE, INC. **No.** 1147458

TRAILER INTERCHANGE RECEIPT/CONTAINER MANIFEST

CONTAINER CHASSIS 20 | 35 | 40 | 45 | 9'6" | REEFER | OPEN TOP | TANK | FLAT BED | CONTAINER NO. ▶ | CD

TRUCKING COMPANY FULL NAME	TRK. CO. CODE	TRACTOR LICENSE NO.	CHASSIS NO. ▶

TRAILER LICENSE NO.	CARRIER TRACTOR WT.	INBOUND ☐ FULL ☐ EMPTY	OUTBOUND ☐ FULL ☐ EMPTY	SEAL NO.

GATE STAMP	GEN. SET NO.	UNIT RUNNING ☐ YES ☐ NO	TEMP. REQUIRED
SCALE WEIGHT LANE DATE	OPERATOR	SERVICE	

SHIPPING INFORMATION

BOOKING NO.	COMMODITY

TYPE PLACARD	CARGO WEIGHT	SHIPPER	VESSEL/VOYAGE

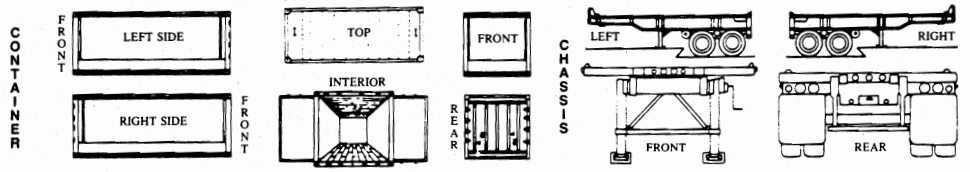
CONSIGNEE	ORIGIN CITY	DISCHARGE TERMINAL	DESTINATION CITY

LOAD INFORMATION

DOCK RECEIPT NO.	NO. PACK	LBS-KILOS-CF	TYPE PLACARD	CONSIGNEE	DESTINATION CITY

EQUIPMENT INSPECTION SECTION

USE THESE CODES ON DIAGRAMS TO SHOW CONDITION:
B BENT | BR BROKEN | C CUT | D DENT | F FLAT | H HOLE | L LEAKING | M MISSING | S SWEEP OUT | T TORN | D/L DEAD LINE



MARK CONDITION BELOW: CHECK BOX ONLY IF DAMAGED AND DESCRIBE IN REMARKS:										POSITION	BRAND CONDITION	POSITION	BRAND CONDITION
ROOF ☐	UNDERSIDE ☐	INSIDE ☐	LEFT SIDE ☐	FRONT ☐	CHASSIS ☐	REAR ☐	RIGHT SIDE ☐	TIRES ☐		R.O. FRONT		L.O. FRONT	
LIGHTS		TARPS/CROSS BOWS								R.I. FRONT		L.I. FRONT	
REFLECTORS		BRAKES/GLADHANDS								R.O. REAR		L.O. REAR	
FLAPS		DOORS								R.I. REAR		L.I. REAR	
SAE 7		LANDING GEAR											

REMARKS	U.S. CUSTOMS

I HEREBY CERTIFY THAT ON THE DATE STATED, I CAREFULLY INSPECTED THE EQUIPMENT DESCRIBED ABOVE AND THAT THIS IS A TRUE AND CORRECT REPORT OF THE RESULTS OF SUCH INSPECTION AND THAT POSSESSION OF SUCH EQUIPMENT WAS TAKEN ON BEHALF OF THE CARRIER OR ABOVE NAMED STEAMSHIP LINE AT THE PLACE AND DATE INDICATED. THIS INTERCHANGE IS MADE SUBJECT TO THE TERMS AND CONDITIONS OF THE CURRENTLY EFFECTIVE TRAILER INTERCHANGE CONTRACTUAL PROVISIONS BETWEEN ABOVE STEAMSHIP LINE AND THE ABOVE MENTIONED CARRIER.

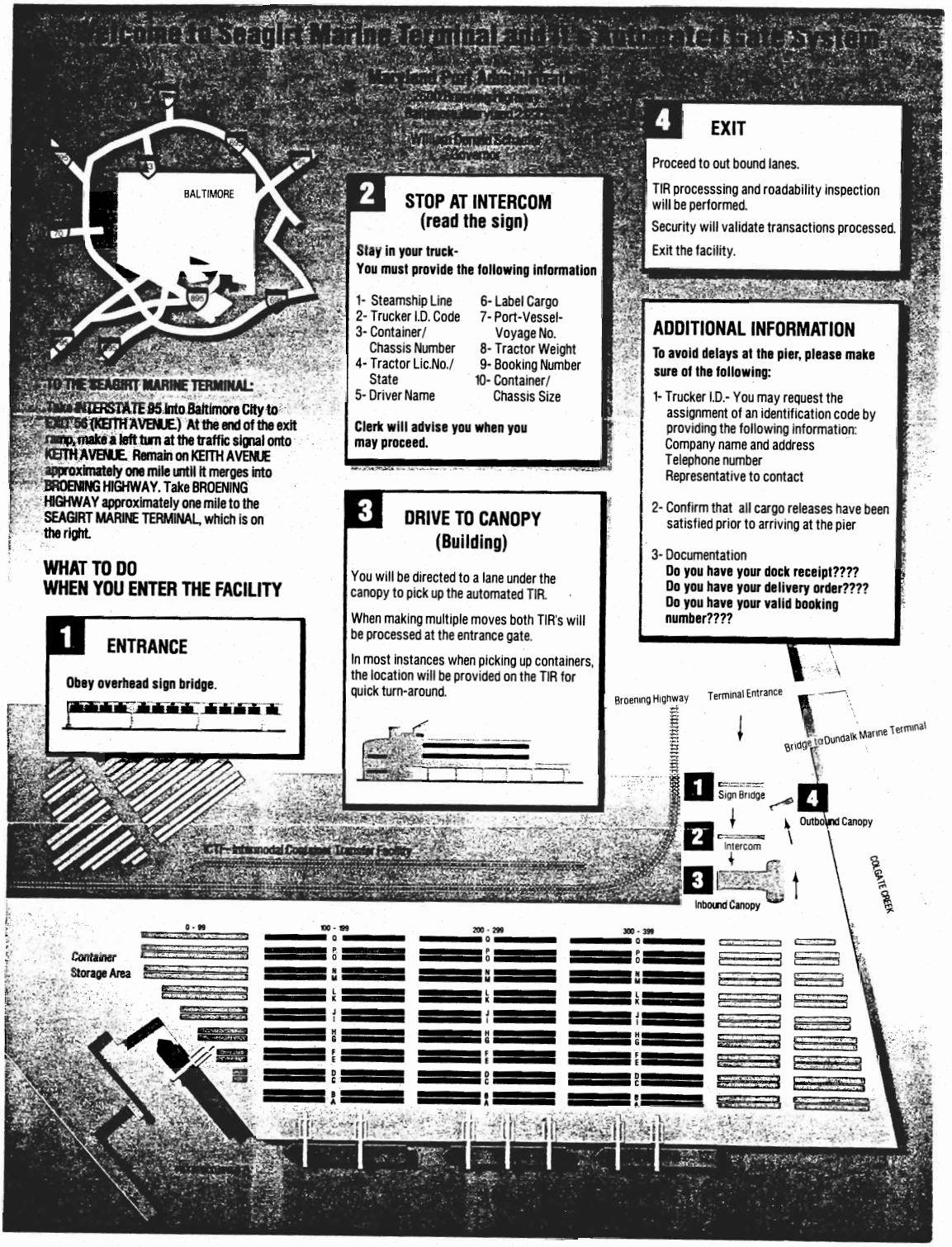
T.I.R. MAN SIGNATURE	TRUCKER'S NAME (PRINT)	TRUCKER'S SIGNATURE	CHECKER'S SIGNATURE

SL-2976-6PT (4/91)

CONTROL COPY

APPENDIX G

PORT OF BALTIMORE'S SEAGIRT MARINE TERMINAL GATE INSTRUCTION FOR TRUCK OPERATORS


BALTIMORE
TO THE SEAGIRT MARINE TERMINAL:
Take INTERSTATE 95 into Baltimore City to EXIT 56 (KEITH AVENUE.) At the end of the exit ramp, make a left turn at the traffic signal onto KEITH AVENUE. Remain on KEITH AVENUE approximately one mile until it merges into BROENING HIGHWAY. Take BROENING HIGHWAY approximately one mile to the SEAGIRT MARINE TERMINAL, which is on the right.
WHAT TO DO
WHEN YOU ENTER THE FACILITY
1 ENTRANCE
Obey overhead sign bridge.
2 STOP AT INTERCOM
(read the sign)
Stay in your truck-
You must provide the following information
1- Steamship Line
2- Trucker I.D. Code
3- Container/ Chassis Number
4- Tractor Lic.No./ State
5- Driver Name
6- Label Cargo
7- Port-Vessel-Voyage No.
8- Tractor Weight
9- Booking Number
10- Container/ Chassis Size
Clerk will advise you when you may proceed.
3 DRIVE TO CANOPY
(Building)
You will be directed to a lane under the canopy to pick up the automated TIR.
When making multiple moves both TIR's will be processed at the entrance gate.
In most instances when picking up containers, the location will be provided on the TIR for quick turn-around.
4 EXIT
Proceed to out bound lanes.
TIR processsing and roadability inspection will be performed.
Security will validate transactions processed.
Exit the facility.
ADDITIONAL INFORMATION
To avoid delays at the pier, please make sure of the following:
1- Trucker I.D.- You may request the assignment of an identification code by providing the following information:
Company name and address
Telephone number
Representative to contact
2- Confirm that all cargo releases have been satisfied prior to arriving at the pier
3- Documentation
Do you have your dock receipt????
Do you have your delivery order????
Do you have your valid booking number????
Broening Highway
Terminal Entrance
Bridge to Dundalk Marine Terminal
1 Sign Bridge
2 Intercom
3 Inbound Canopy
4 Outbound Canopy
COLGATE CREEK
Container Storage Area
0 - 99
100 - 199
200 - 299
300 - 399

APPENDIX H

STEVEDORING SERVICES OF AMERICA'S 'QUICK CHECK' CONTAINER INQUIRY INSTRUCTIONS

Stevedoring Services of America's

Quick CHECK

Piers 94/96, San Francisco
Howard Terminal, Oakland

Computerized Container Availability

Berth 23, Oakland

What do I do first?

Use your touchtone phone to:

1 Dial Quick CHECK 1 • 415 • 824 • 9254

2 Enter the numeric portion of your container number.

3 Quick CHECK will then tell you the following **KEY** information:

- Size of container
- Vessel and voyage
- Discharge status
- Customs release
- Freight release
- Agriculture hold
- C.E.T. hold
- Last free day

Quick CHECK is available 24-hours a day, 7 days a week for your convenience. We hope this will assist you in planning your transportation requirements.

1 • 415 • 824 • 9254

APPENDIX I

CONTAINER INQUIRY SYSTEM INSTRUCTIONS
MAHER TERMINAL
PORT ELIZABETH
NEW JERSEY

MESSAGE	DESCRIPTION	ACTION
Container not on file	No record of container	Verify container number
Container Delivered	Container record shows delivered	Verify container number
Free time expires (date)	Date container may be delivered within free time	Pick up container before free time expires
Container not discharged	Container not unloaded from Vessel	Verify vessel discharge date
No Freight Release	Ocean Freight Not Paid	Contact Steamship Line for resolution
Freight Released	Ocean Freight Paid	Freight Released for delivery
Demurrage Guaranteed	Demurrage Charges Guaranteed by Shipper/ Consignee	Demurrage will be billed
(#) days Demurrage	Number Days Container is past Free Time	Demurrage charges must be paid or guaranteed before delivery
Steamship Line Hold For: Credit Contract Insurance	Steamship Line Imposed hold on delivery	Contact Steamship Line for resolution

NOTE: Container is available for pick up when:

Freight Released
Demurrage Guaranteed or within free time
No Steamship Line Hold
A U.S. Customs Delivery Authorization Document (DAD) is in your possession.

MAHER TERMINALS

Maher Terminals is introducing a new System that is an integral part of its Customer Service which provides container availability information 24 hours per day, seven days per week.

You can verify container availability as well as associated container information from any touch-tone telephone keypad.

The System requires a simple 3 step telephone process:

1. **Dial 201-963-5800.**
2. **Enter your Maher Terminals ID Code.**
3. **Enter Container number**

With 3 simple steps you can have container status at your fingertips without the need for special equipment.

TELEPHONE INSTRUCTIONS

STEP 1. Dial Maher Terminals at:

201-963-5800

The System will respond:

"This is Maher Terminals"

STEP 2. **"Enter your ID CODE"**

STEP 3. **"Enter the numbers portion of the container"**

Your Maher Terminals ID code is the 5 digit account number assigned to all Truckmen, Brokers or Steamship Lines that call at the terminal.

Your ID code will be used to automatically keep track of how you use the System to help determine how we may better serve you.

The alphabetic portion of your ID code is translated into a simple touch-tone code.

A peel-off label enclosed in this brochure may be attached to your telephone for easy reference when dialing Maher Terminals.

Alphabet Translation Table

Character	Touch-Tone Code	Character	Touch-Tone Code	Character	Touch-Tone Code
A	21	J	51	S	73
B	22	K	52	T	81
C	23	L	53	U	82
D	31	M	61	V	83
E	32	N	62	W	91
F	33	O	63	X	92
G	41	P	71	Y	93
H	42	Q	11	Z	12
I	43	R	72		

1 | ABC 2 | DEF 3
GHI 4 | JKL 5 | MNO 6
PRS 7 | TUV 8 | WXY 9
* | 0 | #

MAHER ID CODE: ☐ ☐ ☐ ☐ ☐ ☐

Write in your ID code in the space provided and affix to your telephone.

TO ENTER ID CODE:

EXAMPLE: If your ID code is A1234, you would enter:

[2] [1] [1] [2] [3] [4]

The System will respond:

"ID code A1234"

The System will respond (if you enter your ID code incorrectly):

"This ID code is not on file"

or

"This entry is not valid"

The System will automatically provide a reference number.

The reference number is the sequence number assigned to your call. A file is being created with the data items recited to you by the computer. This reference number should be noted when calling our office with any questions regarding the container status.

The System will respond:

"The Reference Number for this call is #"

TO ENTER CONTAINER NUMBER:

The Container number must be 6 digits. (0 (zero) should precede container numbers that are less than 6 digits.)

EXAMPLE: UFCU 123456 should be entered:

[1] [2] [3] [4] [5] [6]

UFCU 123 should be entered:

[0] [0] [0] [1] [2] [3]

UFCU 12345 should be entered:

[0] [1] [2] [3] [4] [5]

The System will respond with the complete container number.

EXAMPLE:
UFCU 123456 OR UFCU 123 OR UFCU 12345

The System will respond (if this is the only container number on file):

"Container UFCU123456 at Berth #"

The System will respond (if there are multiple containers with a different prefix on file):

"There are multiple containers with this number"
"for container UFCU 123456 press [1]"
"for next container press [2]"

The System will respond (when there are no more containers on file):

"No more containers on file"

The System may be accessed for information for more than one container per call.

The System will respond (after reciting the information for the container you have entered):

"To continue press [1]"

or

"to exit press [0]"

The System will respond (when you press [1] to continue):

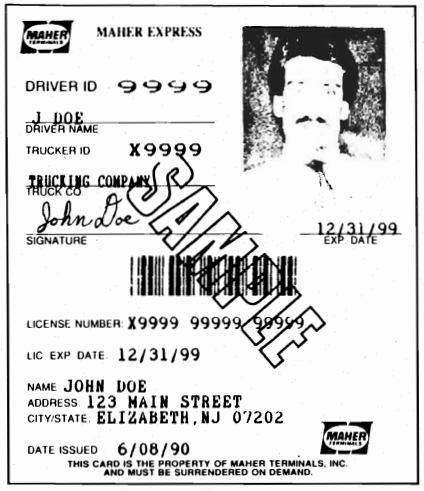
"Enter the numbers portion of the container"

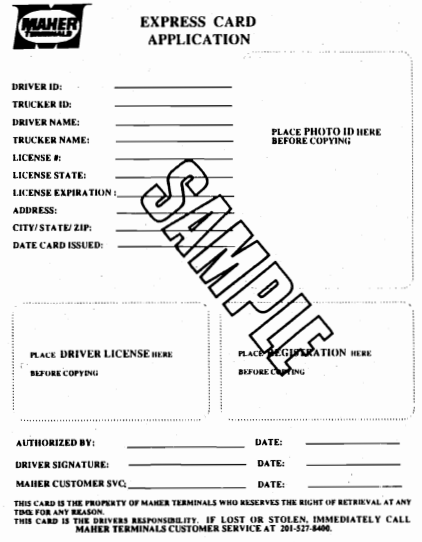
The System will respond (when you press [0]):

"Thank You"

APPENDIX J

MAHER TERMINAL'S
EXPRESS CARD SYSTEM
PORT ELIZABETH
NEW JERSEY





For more information about the Maher Express Card contact:

Raymond Venezia
Vice President
Data Services
Journal Square Plaza
Jersey City, N.J. 07306
(201) 564-7780

H. James McGeehan
Manager Customer Service
Fleet Street Terminal
Elizabeth, N.J. 07201
(201) 527-8200

Leo Finn
Manager Customer Service
Tripoli Street Terminal
Elizabeth, N.J. 07201
(201) 527-8400

Maher Terminals provides express processing through the

MAHER EXPRESS CARD SYSTEM

MAHER TERMINALS

The Maher Express Card is a Photo Identification System for Truck Drivers serviced at the Fleet and Tripoli Street Container Terminals.

- The Express Card System facilitates processing of full and empty containers in the inbound lanes and Delivery Offices.
- The Express Card eliminates the requirements for regi-scoping, provides security checking and a data file of trucking company and driver information.
- Drivers who have been issued Express Cards may go directly to the Delivery Clerks for processing.
- Full container delivery requires original Delivery Order.
- Delivery Clerks will utilize the Express Card and vehicle registration as the two documents to positively identify the driver and truck receiving containers.
- The Express Card drivers are required to show their Express Card at the Outbound Guard Booth as positive security identification before exiting the Terminal.
- Express Card issuance may only be made by application and authorization of trucking company for whom a driver is employed.
- The approved applications are entered into the Express Card Computer System and are filed, along with photo of driver, driver's license and registration, in the Security Department.

Instructions:

Drivers:

- Drivers who have been issued Express Cards may go directly to Delivery Office for processing.
- Present Express Card and truck registration to Delivery Clerk for validation.
- Present Express Card to Outbound Guard for validation before exiting the Terminal.

Trucking Company:

- Applications are available at the Fleet and Tripoli Street Customer Service Office.
- The trucking company is responsible to notify Maher Terminals when a driver terminates or an Express Card is to be voided.

APPENDIX K

MAHER TERMINAL'S
AUTOMATED EQUIPMENT IDENTIFICATION
(Automatic Vehicle Identification AVI)
PORT ELIZABETH
NEW JERSEY

AMTECH Designs, manufactures and installs fully automated equipment identification systems for the Intermodal Transportation Industry.

- AMTECH tags are attached to the truck cab bumper to be automatically identified by readers which relay the retrieved information to the computer.

- Installation of the AMTECH System includes electronic tags, antennas and readers, located at the entrance to the Maher Container Terminal.

- MAHER TERMINALS has developed this system to incorporate AMTECH technology as a front end to its fully functional container control system.

- AMTECH System advantages include reliability and resistance to severe environmental conditions including temperature extremes, electrical interference, shock, vibration, dirt and grease.

- AMTECH is the only supplier of automated equipment that has developed a multi-frequency system that can be used worldwide.

For more information about the automated equipment identification systems contact:

Martec International:

- Elisabeth Meyer
  Manager Specialty Products
  Martec International
  Ewighaus
  910 Oak Tree Road
  South Plainfield, New Jersey 07080
  (908)756-2575

Maher Terminals Administration:

- Raymond Venezia
  Vice President Data Services
  35 East Willow Street
  Millburn, New Jersey 07041
  (201)564-7780

Tripoli Street Container Terminal:

- Gary Cross, Terminal Manager
  Maher Terminals
  Tripoli Street Container Terminal
  Elizabeth, New Jersey 07201
  (908)527-8400

MAHER TERMINALS has developed a strategic alliance with AMTECH Co. of Dallas, Texas and Martec International, a division of Carl F. Ewig, Inc. of South Plainfield, New Jersey, to install an automated equipment identification system at the Maher Terminal Tripoli Street facility.

AUTOMATED EQUIPMENT IDENTIFICATION

MAHER TERMINALS

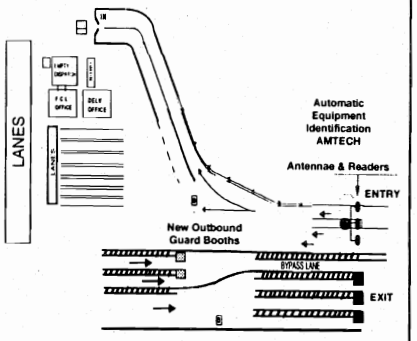
AMTECH
Technology a Generation Ahead™

MAHER TERMINALS

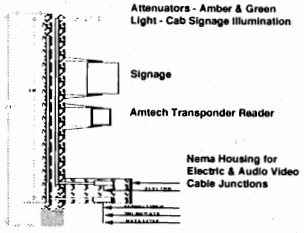
The Automatic Equipment Identification System:

- Expands Container Terminal Services to trucking companies based on automatic equipment identification recorded time data on a unique truck basis.
- Provides a quality service to the trucking trade where "Off Terminal Queue Time" is precisely recorded.
- Accurately records and identifies the arrival and sequence of over the road trucks at Maher Terminals.
- Enables authorization of double move services to truckers who are time recorded by the automatic equipment identification system position instead of time recorded at processing office.
- Provides the native capablility of automatic equipment identification for future development at Maher Container Terminals

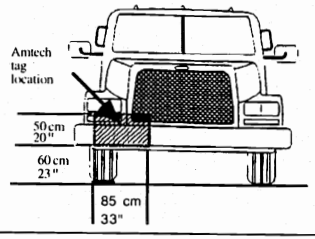
TRIPOLI STREET LANE ENTRY



AMTECH READER INSTALLATION



TRUCK TAG LOCATION



Automatic Equipment Identification Application

□□□□□□□□□□□□□□□□□□□□□□□□□

Trucker Company Name (Maximum of 25 Alpha Numeric Characters)

Field Descriptor	Data Type	Data
Maher Terminal Trucker ID.	1 Alpha 4 Numeric	□□□□
Equipment Group Code	2 Numeric	□□
Tag Type	2 Numeric	□□
SCAC Code	4 Alpha	□□□□
ID# (Tractor License)	Alpha Numeric left Justified	□□□□□□□
Number of Axles	Numeric (0-7)	□
Tractor Tare Weight	3 Numeric (0-250) 100 Kg. Units	□□□
Wheel Base	2 Numeric (26-64) Decimeters	□□
Fifth Wheel Offset	1 Numeric (0-8) Decimeters	□
Tare Weight On Steering Axle	2 Numeric (20-50) 100 Kg. Units	□□
Drive Axle Spread	2 Numeric (0-26) Decimeters	□□

SAMPLE

Place Registration Here and Copy

Copy of Registration

Authorized by: _____
(Please Print)

Signature: _____

Address: _____

_____

Martec Customer Service: _____

Tag ID Data Entry Date: _____

Tag Issued Date: _____

Trucking Company Participation:

1. Sign Application Form
2. Purchase Transponter - Tag Kit
3. Affix to truck bumper according to specification

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