IMPROVING PERFORMANCE IN A GLOBAL LOGISTICS COMPANY: OPERATIONAL PERFORMANCE BEFORE AND AFTER PROCESS IMPROVEMENT

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The purpose of this study was to determine the effectiveness of an intervention designed to eliminate damage notification failures in a customer-specific Standard Operating Procedure used by a global logistics company. Process maps identified locations in the process where damage notification failures could most likely occur. A revised process was designed overnight to eliminate as many notification failure points as possible. In addition, a job aid was included to help facilitate the process change for the drivers. The results of the intervention showed a rapid and profound decrease in damage notification failures leading to the retention of a large, profitable account with a minimal initial investment of time and money.
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TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF ILLUSTRATIONS</td>
<td>vi</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2. METHOD</td>
<td>11</td>
</tr>
<tr>
<td>3. RESULTS</td>
<td>18</td>
</tr>
<tr>
<td>4. DISCUSSION</td>
<td>25</td>
</tr>
<tr>
<td>REFERENCE LIST</td>
<td>49</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Experimental Account Shipment Data- January 1, 2001-January 31, 2003</td>
<td>32</td>
</tr>
<tr>
<td>2. Comparison Account 1 Shipment Data- January 1, 2001-January 31, 2003</td>
<td>34</td>
</tr>
<tr>
<td>5. Comparison Account 4 Shipment Data- January 1, 2001-January 31, 2003</td>
<td>40</td>
</tr>
</tbody>
</table>
# LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Experimental Account- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>33</td>
</tr>
<tr>
<td>2. Experimental Account- Total Number of Shipments Handled by the NAL Driver</td>
<td>33</td>
</tr>
<tr>
<td>3. Comparison Account 1- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>35</td>
</tr>
<tr>
<td>4. Comparison Account 1- Total Number of Shipments Handled by the NAL Driver</td>
<td>35</td>
</tr>
<tr>
<td>5. Comparison Account 2- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>37</td>
</tr>
<tr>
<td>6. Comparison Account 2- Total Number of Shipments Handled by the NAL Driver</td>
<td>37</td>
</tr>
<tr>
<td>7. Comparison Account 3- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>39</td>
</tr>
<tr>
<td>8. Comparison Account 3- Total Number of Shipments Handled by the NAL Driver</td>
<td>39</td>
</tr>
<tr>
<td>9. Comparison Account 4- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>41</td>
</tr>
<tr>
<td>10. Comparison Account 4- Total Number of Shipments Handled by the NAL Driver</td>
<td>41</td>
</tr>
<tr>
<td>11. Comparison Account 5- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>43</td>
</tr>
<tr>
<td>12. Comparison Account 5- Total Number of Shipments Handled by the NAL Driver</td>
<td>43</td>
</tr>
<tr>
<td>13. Comparison Account 6- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver</td>
<td>45</td>
</tr>
<tr>
<td>14. Comparison Account 6- Total Number of Shipments Handled by the NAL Driver</td>
<td>45</td>
</tr>
<tr>
<td>Chapter</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>15</td>
<td>Cargo Checklist</td>
</tr>
<tr>
<td>16</td>
<td>“Is” Process Map</td>
</tr>
<tr>
<td>17</td>
<td>“Should” Process Map</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Performance improvement should be an indispensable part of every business and organization in the world today. Global competition is continuously increasing, and without the ability to constantly change and adapt to the environment, a business will not survive. An increasing buyer’s market is providing consumers with more options, and a business must have the right tools to continuously improve the way in which it does business, not only how it is conducted, but the cost, quality, quantity and timeliness with which it is conducted. For the past few decades, performance improvement practitioners have been developing and improving models and techniques to assist organizations in dealing with performance deficits (Daniels, 1989; Gilbert, 1978/1996; Stolovitch & Keeps, 1992; 1999). Whether an organization needs to increase desired performance, decrease unwanted performance, or train for a completely novel performance, performance improvement methods can help achieve that goal.

At present, there are several approaches to performance improvement. Some models emphasize performer behavior as the key driver of organizational improvement; other models emphasize a more systemic view of organizations and improvement strategies. All of these approaches may be referred to as human performance technology (HPT), a term used by many practitioners and organizational consultants to identify methods dedicated to improving organizational results (Stolovitch & Keeps, 1992). Of the behavior-focused approaches, typically referred to as organizational behavior management, the performance management approach of Daniels (1989) is probably the most well-known. Performance management is a data-oriented, systematic approach to dealing with people in organizations that emphasizes
positive reinforcement as the most effective means to maximize performance. Two of the key words in the definition of performance management that distinguish and elevate it above and beyond other business improvement techniques are “systematic” and “data-oriented.” The term systematic refers to the need to specify the behaviors and results that performance management is to affect to determine the effectiveness of any particular management procedure. The term data-oriented is fairly self-explanatory in that any changes made to the motivational strategies of the organization must be driven by quantifiable data based on objective observation and measurement. Performance management approaches often analyze behavioral contingencies affecting performers and try to adjust those contingencies to generate more productive behavior.

Gilbert (1978/1996) also looked at performer behavior as important in performance improvement, but he emphasized the primacy of accomplishments as the focus of improvement efforts. Behavior was seen as a cost involved in producing a worthy result. One can, according to Gilbert, improve results by changing behavior through antecedent or consequence manipulation or by making other changes such as providing better tools. Gilbert developed an analysis tool (the behavior engineering model) that has been extremely influential in HPT. The behavior engineering model consists of six categories of environmental and personal variables that can affect human performance. The two areas of environmental and personal components are further separated into three groups: antecedents, behavior pre-requisites and consequences. The model therefore consists of six “cells,” each of which contains variables that strongly affect performance. The environmental component includes direction (e.g., feedback, job descriptions, and goals), resources which include such things as proper equipment and superior materials, and finally contingencies (e.g., performance-based pay, rewards, and effort penalties). The personal component of the behavior engineering model includes the performer’s knowledge (e.g., proper
training), capacity (e.g., literacy and health), and motives (e.g., the alignment of personal motives with what the job offers). Even though the model appears simple, it “represents six kinds of reasonably small investments that can yield great returns in improved performance” (Gilbert, 1978/1996, p. 88). By using the six cells of the model to direct questions towards the root cause of performance problems, performance improvement practitioners can usually identify the causes of the problem fairly quickly and at little cost (see, e.g., Dean, 1994).

In the consulting realm, Binder (1998) took Gilbert’s six-celled behavior engineering model and adapted the categories to effectively communicate and apply performance improvement principles with ordinary non-technical people in organizations. When Binder first began to adapt Gilbert’s model, he tried to relate it to Skinner’s three-term contingency (Skinner, 1969). Binder realized that by relating the behavior engineering model to operant conditioning, his clients often began to focus on behavior, and not its accomplishments. Therefore, he found it easier and more productive to communicate to corporate clients about the behavior engineering model, without reference to Skinner or operant conditioning, by making minor language adjustments to focus on accomplishments rather than behavior. Another problem Binder found was the name of the model- “behavior engineering.” Some of his clients would substitute the phrase “performance” for behavior to acknowledge the fact that performance, or accomplishments, was what they were trying to focus on and not behavior. But, the factors sorted by the six-cell model are those that affect behavior, and after trying with little success to correct clients’ wording, Binder began to use the trademarked term “six boxes” to refer to this analysis tool.

The more systems-oriented approaches within HPT are represented by Brethower’s early work in describing the total performance system (Brethower, 1972; 1982) and later elaborations
by Rummler and Brache (1995). These systems views stand in contrast to the understanding of an organization gained by examining the typical vertical (or top-down) view of the organization. The typical organizational chart is the traditional representation of the vertical view of an organization. The organizational chart is useful in showing reporting relationships, but it does not show how the work gets done in the organization and the inputs and outputs of the organization. The systems, or horizontal, view of an organization incorporates these missing components by including the role of the customer, the competition, the actual workflow within the organization, the product of this workflow delivered to customers, and other outputs (e.g., value to shareholders).

Besides the systemic view of organizations, Rummler and Brache (1995) created a three levels framework to help identify the causes of performance problems. The three levels consist of the organization level at the top, followed by process level and finally the job/performer level. The three levels of performance however are only a single dimension of the framework. Three other factors, or performance needs, comprise the second dimension of the three levels framework and help to determine the effectiveness at each level. The three performance needs are goals, design and management. The goal of any process is its ultimate reason for existence, and provides standards in regard to customers’ presumptions for product and service quality, quantity, cost and timeliness. The design, or structure, of the three levels must include the necessary components put together in such a way that enables the goals to be met effectively. Finally, the management at all three levels must ensure that goals are kept current and achievable. By combining the three levels with the three performance needs, we get the nine performance variables that create an extensive list of improvement levers that can be manipulated by management to correct performance problems (Rummler & Brache, 1995).
Gilbert’s (1978/1996) behavior engineering model is incorporated into the three levels of Rummler-Brache at the job/performer level. Thus, the variables Gilbert emphasized as relevant to promoting individual performance (e.g., goals, feedback, tools, incentives, and training) are included in the Rummler-Brache model. The major contribution of Rummler and Brache (1995) was to additionally emphasize the analysis of problems and solutions at the higher process and organizational levels. An organization can only achieve its goals and produce its outputs through its processes. The processes include the workflow through the organization and the associated employee roles and responsibilities. Organizational functioning typically consists of several core processes (e.g., product manufacturing) together with supporting processes (e.g., administrative activities such as payroll). Processes include inputs necessary to begin the process as well as the outputs of the process. Some process outputs may be inputs to a connected downstream process, but all processes are ultimately related to the output to the customers.

It is at the process level that Rummler and Brache have found the largest potential for improvement within an organization. Defective processes can overwhelm the contributions of a competent individual performer, so process improvement is a key step in improving overall productivity of the organization. Process mapping (diagramming workflow) is used to document the current process steps, producing what is called an “is” map. Then problem areas are identified and a revised process map (called a “should” map) is produced as a blueprint for process redesign.

Performance improvement is always possible at the performer level but the organizational impact of this improvement will be limited by the capacity of the processes involved. For example, an office worker in one job can produce needed paperwork quickly and accurately, yet pass it on in a process that involves redundant reviews that add costs but no value.
and slow the time it takes for the paperwork to make its way through the organization. Such a process might produce a product too overpriced and delayed to satisfy customers despite the efforts of some competent individuals within the organization. Rummler and Brache helped clarify the mission of HPT by revealing that organization-wide performance improvement requires proper process design and management as well as the proper variables necessary for optimum performance by the individual.

Malott (2003) has combined both the behavior-focused and systems-focused approaches to HPT in what she refers to as behavioral systems analysis. She sees the two approaches as complementary and necessary for producing and sustaining performance improvement across the entire organization. In Malott’s behavioral systems engineering model, the organization, its systems and processes are first understood and changed to enable performance improvement. Then, behavioral contingencies at the level of the individual performer are examined and changed to promote behavior that will produce the desired accomplishments within the organization’s systems. Although her model is presented in a serial top-down (systems to behavior) fashion, there is no reason why performance improvement efforts could not address systems-level and performer-level issues simultaneously to speed up the analysis and intervention stages.

When put into practice, the HPT approaches and models of Daniels (1989), Gilbert (1978/1996), and Rummler and Brache (1995) can be powerful tools. LaFleur and Hyten (1995) used a modified version of Gilbert’s behavior engineering model to assess and improve performance discrepancies of a banquet department staff at a north Texas hotel. Banquet staff were required to set up room layouts for meetings and conferences at the hotel. There were many different setups required by the various meeting formats, and typically these setups
contained errors (e.g., insufficient silverware for dining) or were late in being completed. Analysis by Lafleur and Hyten revealed that the performance problems were due to weak antecedents, inefficient work procedures, inadequate training and weak performance contingencies. The authors implemented a multi-component intervention package that included feedback, task checklists, monetary bonuses, job aids, goal setting and training to improve performance. The results of the intervention showed a profound increase in performance from a completion percentage (percent of elements in each job completed accurately and on time) of 68.8% in baseline 1 to a final setup completion of nearly 100% during the intervention phase. Through the use of Gilbert’s model, LaFleur and Hyten (1995) were able to increase performance of banquet staff approximately 30%.

Chhabra (2000) developed a performance improvement intervention in an accounting firm based on Rummler and Brache (1995) style analyses. The firm involved was experiencing problems with the timeliness, quality, and costs involved in processing tax returns. Timeliness issues involved not meeting the set turnaround time standard for preparing and processing tax returns. The quality issues involved time-budgeting problems, which tended to encourage speed over accuracy leading to increased errors and re-work, further delaying turnaround time. Re-work added to costs of the job affecting the profitability of the work.

Chhabra mapped the key process steps for handling tax returns, looking for poorly designed or managed elements. She discovered several opportunities for performance improvement, and presented these to management in a follow-up meeting. An intervention was decided on in this meeting that involved re-engineering of the core process so that simple tax returns would be handled differently than more complex tax returns. The new process for simple tax returns would be more streamlined than the original process and was designed to reduce
costly re-work that occurred when work looped several times between preparer and reviewer. This back and forth activity between preparer and reviewer in the original process was often necessary for more complex returns (and was justified by the higher fees charged for such work) but it was making simple tax returns less profitable. Analysis of data from an implementation of the new simplified process revealed a decrease in simple tax return turnaround time from an average of 27 days in the preceding baseline year to 17 days. Importantly, the simple tax returns were also more profitable as a result of the new process. Unfortunately, no objective quality data were taken on number or type of errors in processing the simple returns, but one can deduce that any errors that occurred were not of sufficient magnitude or frequency to adversely affect processing time and thus profitability. In sum, the process improvement approach by Chhabra (2000) produced a significant impact on key aspects of the performance problem identified at the outset.

Process redesign has been used and advocated by experts in the field of supply chain management, which includes movement of goods between suppliers and business and between business and customers. Handfield and Nichols (2002) provide guidelines and examples of how process mapping can be used to improve supply chain performance within and across organizations functioning as partners in the supply chain. They also emphasize measures of supply chain performance, particularly emphasizing timeliness and cost measures.

Performance improvement interventions often come in the form of treatment packages with multiple components designed to address factors suspected to be contributing factors in causing the performance problems. Elements found in these packages depend on the deficiencies revealed by the performance analysis. Job aids are a common antecedent-based treatment package component. Job aids are a cheap, simple and effective tool that can be used to improve
the performance of individual workers who are unsure what to do or how to do some aspect of their jobs. Rossett and Gautier-Downes (1991) defined a job aid as a “repository for information, processes, or perspectives external to the individual and that supports work and activity by directing, guiding, and enlightening performance” (p.4). Job aids may be as simple as checklists or more complicated information in the form of heuristic advice. All job aids are designed to influence performance by providing information or direction during performance, not prior to performance as is typical with more costly training methods (Nelson, 1997).

Brethower and Smalley (1998) argued that job aids can be beneficial in increasing reliability in performing infrequent tasks, enabling efficient changes in procedures, and insuring consistency in performance across multiple workers. Gilbert (1978/1996) pointed out that properly designed job aids could replace a great deal of training. “The greater the complexity of a task, the more superior guidance is as a technique, because it reduces the probability of error and the need for training” (p. 208). Gilbert includes job aids, such as checklists, in what he called “guidance tools.” Deterline (1999) observed that the simple job aid is often overlooked, underrated and underused, possibly because some managers see job aids as “cheat sheets,” and feel that a competent employee should be able to perform his/her job without the use of them. According to Deterline, however, performance improvement consultants have stated that job aids are one of their most frequently used devices, generally in combination with other interventions (as in the LaFleur & Hyten study described above).

The performance improvement project detailed in this thesis took place in the North American operations (NAL) division of a large global logistics company. The operations of the NAL division provide pickup, transportation and delivery services for many different types of companies throughout the US. This particular case study focused on the delivery services
provided to a high profile customer that brings in $3 million annually at a profit margin of approximately 40%. The problem, as stated by the customer, was the lack of communication to them of damages to product prior to final delivery to their customer. According to standard operating procedures (SOP) agreed to by both parties prior to implementation of the business, the customer was to be notified of all damages prior to delivery in order to provide guidance on how to proceed. Damages in and of themselves, although a concern, were less important than the fact that they were finding out about the damages from their customer receiving the product rather than from NAL prior to delivery of the product.

The purpose of this study was to determine the effectiveness of a process change in the customer-specific SOP of the target customer in eliminating damage notification failures. A job aid, in the form of a checklist, was also introduced to communicate the process change to the drivers who would be directly affected by it, as well as prompt their behavior of reporting damages properly. The process change implemented was customer-specific, and affected the different functions performed by operations including the account manager, origin operations personnel, drivers and destination operations personnel. However, all 34 locations of NAL handled several of the customer’s shipments at some point throughout the study, and some company-wide changes occurred as a result of this customer-specific intervention.
CHAPTER 2

METHOD

Employees and Setting

The following process/performance analysis and improvement project took place in the North American division of a large, worldwide logistics/transportation company. NAL contributes approximately $140 million a year to global annual sales of nearly $7 billion. The corporation employs more than 55,000 people in 1,300 locations in over 120 countries worldwide. In its largest division, of which NAL is a part, the company moves nearly 520,000 tons of airfreight annually, equaling almost 3.1 million shipments at a cost of over $1 billion paid to the world’s major air carriers. Its customers include over two thirds of the world’s largest, quoted non-financial companies. Some of the corporation’s core services include E-commerce fulfillment, home delivery, regional and global freight management, supply chain management and solutions design, technology, transportation as well as warehousing and distribution services. The company, as a whole, is a global leader in supply chain management, providing customer-focused solutions to a wide range of manufacturing and retail industries.

The focus of this analysis and intervention was the performance of contracted company drivers and agents delivering shipments to the end user of the customer (the customer of NAL is a supplier of equipment to its customers). This study took place over a two-year period, and calculating the actual number of contracted drivers and agents involved was not possible. Deliveries occurred in all 50 U.S. states as well as all of the Canadian provinces. For some destinations, the delivering driver would have been the same each delivery, but for most
locations, any driver available at the time the freight arrived at the airport would have been sent to recover the shipment and deliver to the final destination.

Procedure

*Performance problem.* On Monday October 15, 2001, I received an e-mail, then a phone call from the sales owner of the target customer’s account that was the focus of this study. The sales owner requested help in altering the standard operating procedure (SOP) and process for the customer to address a problem that threatened loss of the business if an immediate “fix” was not found and implemented to stop the problem from re-occurring. The problem in this case was product or “shipments” being delivered to the target customer’s end user damaged, whether actual or just cosmetic damage was observed, without the customer being notified and providing guidance prior to delivery to the end user. The product being delivered was delicate and expensive laboratory equipment including complete diagnostic systems, computer/replacement parts for diagnostic systems and DNA sequencing machines costing $1,000,000 per piece. The target customer took the position that they would not want to receive a product at their doorstep with even just cosmetic damage for which they had just paid $500,000-$1,000,000. The customer was receiving calls from their end user notifying them of the damage prior to being notified by NAL. This was unacceptable to the target customer as they felt that NAL should have notified them that the product was damaged before NAL delivered the shipment to the end user.

Cosmetic damage is defined as any damage to the packaging of the shipment, or the contents of the shipment itself, that in no way affects the performance of the equipment inside. Conversely, actual damage would include any of the above that resulted in the non-performance or decreased performance of the product/equipment inside. The customer was aware of the fact
that due to the nature of the equipment and packaging, actual and cosmetic damages were going
to occur at some times during transit. Damages in and of themselves were of less concern to the
customer than the fact that their product was being delivered to their end user damaged, without
NAL notifying the customer of the damage and asking whether the customer preferred to hold
the product for inspection, deliver “as is” to the end user, or some other alternative. Damages
that were cosmetic could be fixed prior to final delivery, and actual damages that were
discovered would be covered by insurance for repair or replacement of the product. What was
not repairable was the shipper’s image, in the eyes of their end customer, after the customer had
received an expensive piece of laboratory equipment with damage. This was unacceptable to the
NAL customer, and an immediate solution was demanded by the customer to ensure that this
never occurred again, or all future business between the shipper and NAL would be permanently
suspended.

   Problem analysis. Problem analysis was very limited due to the time constraints imposed
by the customer for a solution to the problem. The customer demanded that a solution be found
and implemented within 24 hours to eliminate the problem, or all business between the two
companies would be suspended. Because the problem defined by the customer was lack of
communication, I decided to look for places where the communication could breakdown, versus
where it actually broke down, and what I could do to limit these. Depending on the nature of the
shipment being delivered, the product might have to be delivered immediately upon recovery at
the airport, or returned to the destination station for later delivery. Company, as well as the
customer-specific SOP, dictates that it is the destination station’s responsibility to notify the
origin station, account manager, or customer support center that damage has occurred. The
origin station, account manager, or customer support center is then responsible for contacting the
customer to notify of damage and receive guidance on whether to deliver or hold the shipment, or to make that call themselves, depending on the customer’s requirements. Based on the above procedures, communication breakdowns could occur at several points. One would be when the shipment must deliver immediately upon recovery from the airport. If the driver discovers damage to the shipment, he/she would need to report this to his/her dispatcher at the destination station. The destination station would notify the origin station that would contact the customer to notify them of the damage and get instructions. Once instructions were received from the customer, the origin station would return instructions to the destination station. The driver must wait for a response from his/her dispatcher before proceeding to deliver the shipment. When a shipment was not as time-critical, and had time to be returned to the destination station prior to delivery, the above procedures were still to be followed. This return to the destination station eliminated one possible place for a breakdown to occur (between driver and dispatcher).

However, the two opportunities for breakdowns to occur between destination station and origin station/account manager/customer support center and then the customer would still exist. As per existing requirements of the customer, the destination station was to notify a dedicated account manager of any damages who would then contact the customer for instructions, and return these instructions to the destination station and ultimately the driver.

*Process maps.* Process maps were used to visualize the standard operating procedures detailed above. An “is” map was created to show all of the steps involved in the transfer of damage information from the driver, to the customer, instructions from the customer back to the driver, and to help identify where breakdowns in communication could occur. The process map does not show all of the procedures involved in the process of shipping for the customer. Many of the steps left off of the map were irrelevant to the performance problem in question. The
“meat” of the map begins from where damage is discovered by the driver, and traces the transfer of information throughout the organization to the customer, and the customer’s instructions back to the driver on how to proceed in handling the damages incurred. These steps hold true across the whole company, and were detailed the same in the customer-specific SOP. In the process maps, origin stations are abbreviated “ORG” and destination stations as “DST”.

The damage information transfer process began immediately upon discovery of damage by the driver. The driver was to note the damage on the carrier’s master air waybill (MAWB) and immediately notify his/her dispatcher of the damage prior to departing the carrier’s door. Depending on the nature of the shipment, the driver might proceed to the consignee and deliver, return to his/her dock, or proceed onto another recovery, but this was determined on a case-by-case basis. The dispatcher is responsible for notifying his destination operations of the damage, which in turn would notify the origin station. The origin station’s operations were responsible for notifying the account manager who would notify the customer and request instructions. Instructions, once received from the customer, were returned back through this chain to the driver. Upon receipt of instructions, the driver would proceed as instructed and the process terminated.

The process map was reviewed to see where communication breakdowns, or “disconnects,” might occur. It can be easily seen in the “is” map that the transfer of information has many handoff points from the time the driver discovers the damage and reports it back to the dispatcher, and the time the driver receives instructions from the dispatcher on what to do with the damaged shipment. The information derived from the “is” process map was used to create a “should” process map, minimizing the places where communication breakdowns could occur and hopefully eliminating the damage notification problem. The customer-specific standard
operating procedures were then modified to mirror the “should” process map and minimize the points at which there could be an opportunity for communication breakdown.

*Performance improvement intervention.* By taking out all of the “middlemen,” and having the driver contact the account manager directly with any reports of damage, and then wait for a response from the account manager as to how to proceed with the shipment, this would remove many of the places in the communication chain where a breakdown could occur. The driver would still have to notify his dispatcher of his status, but would bypass them for the transfer of damage information to the account manager. The customer’s SOP would be changed to reflect this new streamlined process. This process would leave only communication between the driver, the account manager and the customer.

In order to facilitate the change in process and insure that drivers immediately began to follow the new procedures, it was decided that a job aid was needed. A cargo checklist was created that would accompany every shipment for this customer from the time of pickup until final delivery. This checklist would provide the driver with detailed instructions on what needed to be looked for on every pickup, recovery and delivery in regards to damage for this particular customer. The pickup driver only had to check off some boxes, fill in some blanks and make short notations if any damage was found. This copy of the checklist would then be given or faxed to the account manager who would review to ensure that the shipment was picked up damage free. While the shipment was in transit, the account manager would fax the checklist to the destination station. The driver from the destination station who was sent to recover the shipment would take this checklist with him and fill out the second section of the checklist, which was exactly the same as the first section that the pickup driver filled out. The checklist stated that if at any time damage was discovered, the driver was to immediately hold the freight
and call the account manager whose direct number was on the checklist. The account manager would request a description of the damage as noted on the checklist and tell the driver to wait for his call back and instructions before proceeding. The account manager would contact the customer, relaying all the pertinent information and request direction on how to proceed. Once the customer had made their decision, these instructions were returned to the driver by the account manager and were to be followed. Once the delivery was completed per the customer’s instructions, the final checklist was faxed back to the account manager to be filed with the other shipment paperwork.

Design

An AB experimental design was used to measure the success of the process/performance improvement intervention introduced during this project. This design was utilized due to the fact that there was only one experimental customer, and the intervention was not reversible from a practical business standpoint. AB designs are susceptible to threats to both internal and external validity, especially the influence of confounding variables (Barlow & Hersen, 1984). Despite these limitations, in situations where the repeated introduction and withdrawal of experimental variables are not feasible, the AB design might be the only design possible. To address the limitation issues of this design, shipment damage report data from other comparable customers were analyzed and will be discussed further. These comparisons can help reveal whether similar changes in performance occurred with other customers who did not receive the same experimental intervention as the target customer discussed above. Such comparisons can then be used to examine whether confounding variables were likely or unlikely to have produced the effects seen with the experimental target customer’s shipments, thus addressing the internal validity concerns raised by the AB design.
CHAPTER 3

RESULTS

In order to evaluate the impact of the process change on performance, computer data records were pulled and analyzed for all shipments from January 1, 2001 through January 31, 2003. Records were reviewed for all shipments for any notation of damages and how the damages were handled. Data before the introduction of the intervention, which began on October 16, 2001, were compared with all shipments that occurred after that date to see what changes, if any, occurred. The same data for similar accounts that did not receive the intervention were also compared to see if there were any system-wide effects that might have coincided with the introduction of the performance improvement intervention and could have affected the results of the account with the performance problem. Comparison accounts were chosen based on various factors that in some way related them to the target account including volume of shipments, similarity of products, susceptibility of those products to damage and revenue potential. It should, however, be pointed out that no other customer of NAL compared exactly in all dimensions to those of the target customer. Shipments were placed into three distinct categories: shipments with no damage, damaged shipments handled correctly, and damaged shipments handled incorrectly. The goal was to have all shipments that were damaged during transit handled correctly by the driver. A damaged shipment handled correctly by a driver was defined as a shipment where the target customer was notified of damaged product prior to delivery to the end user, and the driver awaited the customer’s instructions prior to final delivery.
Operational Data

*Experimental account.* Table 1, Figure 1, and Figure 2 show the data for the target customer (the experimental account). The number of shipments monthly varied greatly, ranging from a low of 225 during the month of January 2003 up to a maximum of 516 in June 2001. The number of damaged shipments did not appear to correlate with the number of shipments per month. November of 2002 had the most damages with 15, all handled correctly, but only had a total shipment count of 236. June 2001, with the most shipments of 515, had only 3 damages, but all were handled incorrectly. Data on the destinations were also compared to see if there was any relationship between the number of damaged shipments and the cities that were receiving them. Of the 17 shipments that were damaged and handled incorrectly, 7 (41%) of them occurred in the city of San Francisco. This may seem like the San Francisco station had a disproportionately high incidence of mishandling damaged shipments, but 4108 of the 8322 total shipments (49% of the total number of shipments) were delivered in San Francisco, so the percent of damaged shipments handled incorrectly appears to correspond to the volume of shipments received at that station.

There were a total of 8322 shipments handled for the customer between January 1, 2001 and January 31, 2003. Prior to the intervention, 3449 shipments were moved, with 3404 of those moving without any damage. Of the 45 shipments (1.3% of total shipments) that sustained damage, 29 (64%) of those damaged shipments were handled correctly and 16 (36%) were handled incorrectly. Following the introduction of the process change and the job aid, there were 4873 shipments moved. Of these 4873 shipments, 131 shipments were damaged (2.7% of total shipments), all handled correctly with the exception of one, in October of 2002, one year after the performance improvement implementation. This constitutes a reduction in proportion of
handling errors from 36% in baseline to less than 1% during intervention. It can be seen in Figure 1 that despite an increasing trend in the number of damaged shipments, the damage notification procedure continued to work well. Figure 2 shows the total number of shipments tendered by the customer to NAL in the baseline and intervention phases. Shipments cycle across months, but this pattern is very stable.

Comparison accounts. Tables 2-7 and Figures 3-14 show the same data for the six different NAL customers chosen for comparison to the target customer. Of particular interest is the number and proportion of handling errors (a damaged shipment not reported properly) from November 2001 onwards- the time period during which the intervention for the target customer was in effect. Damage handling varied for each of these comparison customers with some showing patterns similar to the target customer and others showing different patterns across the months. For comparison account 1, total monthly shipments remained fairly stable throughout the course of the experiment, with a marked increase beginning in June 2002, peaking in August of 2002, returning to previous levels for the rest of the year. The number of damaged shipments varied greatly across the whole time period with the number of damaged shipments increasing in 2002, and the number and proportion of incorrectly handled damaged shipments increasing in 2002 over 2001 levels. In 2001 prior to the intervention for the target customer, only 2 (10.5%) of 19 damaged shipments (1.13% of total shipments) were handled incorrectly, whereas 16 (36%) of 45 damaged shipments (0.82% of total shipments) were handled incorrectly from November 2001 onwards. This pattern stands in contrast to that of the target customer account, for which incorrectly handled damaged shipments remained at or near zero for all of 2002.

Total shipment volume for comparison account 2 steadily increased throughout the course of the experiment, with the number of damaged shipments remaining extremely low.
During the period corresponding to baseline, 5 (100%) of the damaged shipments (0.54% of total shipments) were handled correctly. While the intervention was in effect for the target customer, there were a total of 14 (0.47% of total shipments) damaged shipments with 11 (79%) being handled correctly. Comparison account 3 showed a consistent monthly shipment volume averaging around 350 per month. The total number of damaged shipments remained low throughout the duration of the experiment, and handling errors were almost equally likely before and after the October, 2001 intervention date for the target customer (4 errors before and 3 afterward). However, due to the slight increase in the number of damaged shipments from baseline, the proportion of damaged shipments handled incorrectly decreased from 57% (4/7) to 30% (3/10) from the corresponding baseline to intervention period of the target customer.

Total monthly shipment volumes for comparison account 4 varied from as few as 95 in April of 2001 to almost 350 in May of 2002. The total number of damaged shipments for this account was fairly high versus the other comparison accounts, with many more of them being handled correctly rather than incorrectly. Six of the eight handling errors occurred in 2001 prior to the intervention for the target customer, and only 2 errors occurred following the date of intervention for the target customer, so this account shows a pattern of errors somewhat similar to that of the target customer. In terms of proportion of damaged shipments handled correctly and incorrectly, the improvement in 2002 represents a change from 16% (6/37) damaged shipments handled incorrectly in baseline to 7% (2/28) handling errors during the intervention.

The number of damaged shipments handled correctly and incorrectly showed as much monthly variation as the total number of shipments handled monthly for comparison account 5. However, 5 of the 6 handling errors for this account occurred in 2002, the time when the intervention was in effect for the target customer and errors were least likely. Due to an
increasing number of damaged shipments post-intervention, the proportion of damaged shipments remained roughly constant across the baseline and intervention periods (25% errors in baseline and 27% errors during intervention). The total number of shipments handled monthly increased for comparison account 6 starting from a low of 65 to a maximum of 360 per month. The number of damaged shipments increased in 2002 relative to 2001, and of these damaged shipments a smaller proportion were handled incorrectly in 2002 (3/13, 23%) relative to 2001 (3/6, 50%). Handling errors remained low in 2002 until the end of the study when there were 3 errors (50% of the total handling errors) from November 2001 through January 2003, a time during which there was only one handling error for the target customer.

Financial Data

*Experimental account.* During baseline (01/01/2001-10/16/2001), the target customer account was billed a total of $3,623,492 for transportation. The cost to NAL for transportation over the same time period was $1,881,876 for a profit of $1,741,615. This translates into a profit margin of 48% (43% or greater is the company-preferred standard). Following the introduction of the intervention (10/16/2001-01/31/2003) total transportation costs of $3,720,068 were billed to the customer at an operating cost to NAL of $2,178,340. This equals a profit of $1,541,728 or profit margin of 41%. Follow-up financial data was collected for the time period of 02/01/2003-12/31/2003 during which the intervention was still in effect. During this time period a total of $2,687,890 in transportation costs was billed to the customer. The operational costs to NAL for this time period were $1,723,376 at a profit of $964,514 yielding a profit margin of 36%.

*Comparison accounts.* Even though the profit margins for the experimental account decreased from baseline after the introduction of the intervention, and further decreased throughout follow-up, when compared to the other six comparison accounts, it does not appear
that this decrease in profit margin can be attributed to the introduction of the intervention.

Several other accounts that did not participate in the intervention also showed decreases in profit margin. Other comparison accounts showed increases in profit margin. Comparison account 1 achieved a profit margin of 51% during the baseline phase of the experiment. During the time period corresponding to the intervention phase, overall profit margin decreased to 42%. Follow-up measures show the profit margin for comparison account 1 declining slightly to 41%. A profit margin of 19% was calculated for comparison account 2 during baseline. Profit margins then decreased during the intervention time period to 17%, but increased dramatically during the follow-up time period to 34%.

Comparison account 3 had a profit margin of 32% during the baseline time period, increasing to 38% in the corresponding intervention time period. Follow-up measures revealed that the profit margin improved to 43% for comparison account 3. A profit margin of 26% was calculated for comparison account 4 across the baseline time period, and increased to 35% during the time period the intervention was introduced to the experimental account. Unfortunately, follow-up profit margin data were not available for this account. The profit margin for comparison account 5 was 30% for the baseline time period. This margin increased slightly to 33% in the intervention time period, and slightly increased again during the follow-up to 37%. For comparison account 6, achieved profit margin during the baseline time period was 38%. During the time period corresponding to the introduction of the intervention, profit margin decreased substantially to 23%, decreasing further to 20% within the follow-up time period.

Performance Improvement Intervention Implementation Costs and Benefits

Calculating the actual costs of implementing the performance improvement intervention would be extremely difficult, as some costs are not easily converted to a specific dollar figure.
Some estimates of costs are possible to derive. The amount of time spent by the account manager daily on managing the checklists (faxing, receiving, reviewing and filing checklists), actual costs of paper and long-distance charges of faxing the documents were estimated by the account manager to cost $50 per day, leading to an annual cost of $13,000 for a total of $29,250 for the time period beginning with the introduction of the performance improvement intervention (10/16/2001) to the end of financial data collection on 12/31/2003. Because the handling errors were threatening loss of this account, it is reasonable to argue that the savings return for the intervention costs was the $2,506,242 in profits generated for NAL by the successful retention of this customer during this time period. An estimate of the annual return on investment (ROI) for this intervention is roughly 76:1 ($1,000,000 in annual profit for $13,000 in annual costs).
CHAPTER 4

DISCUSSION

The present analysis shows that the implementation of the cargo checklist and process change had a positive effect on the handling of damaged shipments for the target customer. Damaged shipments handled correctly increased to nearly 100% during the intervention (with only one handling error one year after implementation) even though the total number of damaged shipments increased during the intervention phase. As a result, the client has been retained and the critical business issue that stimulated this project (the possibility of losing a million dollar account) was successfully addressed.

The comparison of the other six accounts shows no consistent evidence to suggest that some change in the general shipment handling process throughout the organization could have led to performance improvement. Some of the comparison accounts (account 1 and account 5) showed an increase in handling errors or an equal proportion of errors in the timeframe corresponding to the intervention. Other comparison accounts showed a decrease in handling errors during this intervention timeframe, but no reduction was as large as that observed with the target customer. Thus, it seems unlikely that some extraintervention change in company policy or procedures was responsible for the performance improvement seen with the target customer shipments.

The performance intervention introduced was a package combining a process change with a job aid included to help facilitate the process change. It is difficult to determine if one or the other had an independent effect on the performance improvement, or if both contributed to the performance improvement. It is possible that the process change of removing the multiple
communication links between the driver and account manager could have fixed the performance problem alone, but it was difficult to find exactly where the communication breakdown was occurring. The only thing that was known for certain was that the account manager, and ultimately the customer, was not being notified of damages prior to delivery. Whether the drivers were or were not notifying their dispatcher of damage, the dispatcher notifying the destination operations personnel, or the destination operations personnel notifying the origin account manager of damages was hard to determine. What was apparent was that there was a breakdown occurring somewhere along this communication chain and it only made sense to reduce this chain to as few links as possible, reducing as many opportunities for communication breakdowns as was possible.

It is possible that just implementing the checklist as a job aid could have remedied the performance problem. The checklist could have simply directed the driver to stop immediately upon discovery of any damage, notify their dispatcher and await further instruction. It is company-wide standard operating procedure (SOP) for the driver to notify the dispatcher of any damages immediately upon discovery, but waiting for instruction prior to delivery is not. Implementing the checklist alone might have taken care of any performance problem that was created by the driver failing to notify dispatch of damages immediately upon discovery. However, this would have left the multiple communication links between driver and account manager in place, leaving many places where communication breakdowns could occur. Therefore, it only seemed appropriate to cover all possible causes of the performance problem by implementing a package intervention including both the process change of communication links, as well as the checklist to cue the drivers when they needed to stop and call the account manager. Notifying the account manager of the damages and awaiting further instructions are not part of
the everyday SOP that drivers are trained to follow, and the checklist proved to be a simple and cost-effective means by which to notify the drivers of the special requirements for this customer.

Another possibility for the positive results observed after the introduction of the intervention package is that other client-specific factors could have contributed to improvements in the way damages were handled. Upon receiving the news that the business would be taken away because of handling errors, the account manager may have stepped up his oversight activities and this could have had an effect on the way drivers were looking for and reporting damages. Most likely, the account manager would have immediately notified operation managers at key stations of the problem, and requested that they have their drivers be more attentive in looking for damages to the shipments, report them immediately upon discovery and to hold the freight for further instructions. Even though this immediate reaction might have produced short-term changes in performance, a sustained effect would probably not have been achieved through this communication alone.

It is also possible that the sales owner called the general managers of the stations most heavily involved in this particular business to notify them of the potential loss of business, with the general managers, in turn, notifying their operations personnel/drivers to be more careful when inspecting the target customer’s freight for damages, report even the slightest appearances of such damage and, most importantly, not to deliver any shipment with even slight cosmetic damage without approval from the account manager. There is a good possibility that this actually occurred, but the sales owner at the time is no longer employed, and I had no way to verify this possibility. Drivers who handled the target customer’s freight more frequently than others might have known the more stringent customer requirements than other drivers who handled fewer of their shipments, but the data does not reflect this possibility as damaged
shipments being delivered incorrectly occurred in many different cities that received larger and smaller volumes of the target customer’s shipments as well as in cities serviced by drivers hired on a per use basis as contractors. Throughout the experiment, the sheer number of station personnel involved in handling the target customer’s shipments across multiple locations means that many of these people would not have received an instruction to be more attentive from either the account manager or the general manager had one been given, so this weakens the argument that treatment effects observed could have been accounted for by such instructions.

The estimated return on investment for the intervention was very high, so there is little argument that the intervention was cost-effective or cost-beneficial. But the intervention only focused on improving the handling of damaged shipments by NAL employees; it did not address the issue of reducing the number of damaged shipments. The original customer complaint that initiated this project did not demand a reduction in damaged shipments altogether. The target customer knew to expect some damaged shipments but insisted that NAL handle such damaged shipments properly. Unexpectedly, the number of damaged shipments per month increased during the time of the intervention. It is unclear why this increase in damaged shipments occurred. It is important to remember that NAL contracts with airlines to haul shipments via air freight if the customer so designates (as opposed to 100% ground transportation), so some damages can occur through airline handling of cargo before the NAL driver picks up the shipment at the airport to deliver to the customer. Changes in airline freight handling could have led to more damages, but there is no data supporting or refuting this possibility.

One might think that the intervention could have inflated the damaged shipment count if drivers reported more damages because of the checklist and increased emphasis on inspecting for damages. This might be possible for cosmetic damages alone, as drivers might have begun
reporting damages they would not have reported prior to the intervention; however, serious damages would be noticed by the recipient of the shipment regardless of whether NAL employees spotted them prior to delivery. In fact, that is how the target customer found out there was a problem with the way NAL was handling damaged freight in the first place, so it seems unlikely that all increased damage counts are simply artifacts of improved reporting by the NAL employees. Instead, it appears that some other unknown variables led to freight being damaged more often during the time coinciding with the intervention targeting the damage notification process.

A decreasing profit margin was observed in the target customer’s account across the entire experimental time period. What might account for this? Was the intervention responsible for this effect? The decreased profit margin might be due not to the improved handling of damaged shipments, but to the financial impact of an increased number of damaged shipments during the intervention and follow-up period. Financial data regarding costs to NAL for actual damages were impossible to calculate, because they were not handled in a manner in compliance with company-wide SOP according to informal interviews with several salespeople. These people described a common deviation from SOP when damaged shipments were detected. Actual damages that should have been processed through the claims department for a financial reimbursement to the shipper were often worked out directly between the shipper and the sales owner, who would discount future shipping costs to cover the replacement costs of the damaged products. Doing this would result in a lower profit margin for the company, and lower commission for the salesman, but avoid a claim being filed against the company’s insurance, which may have been more beneficial to the company in the long run.
Other factors could also contribute to the decrease or increase in profit margins. The 6 comparison accounts showed a variety of changes in profit margins across the complete experimental time period with some increasing across the entire period, others decreasing across the same time period and yet others increasing then decreasing or vice versa. Renegotiated rates, shipment volumes, seasonal shipping changes, and many other factors can affect the overall profitability of an account. Despite the 12% decrease in profit margin on the target customer’s account from baseline through follow-up, profit levels were still more acceptable to NAL than the complete loss of the business. Completely losing the business would have cost the company $2,506,242 in profits that were generated by the retention of this one account. Because the client was retained, the intervention should be considered successful.

It should be noted that the company-wide SOP existing at the start of this project was written to reduce the possibility of damaged shipments being delivered without the shipper being notified prior to and providing instructions. Yet it can be seen in the experimental and comparison accounts that the SOP is not always followed and that simply specifying the SOP does not always work. To expect 100% of all damaged shipments to be handled correctly may be unrealistic, even though it would be preferred. However, based on the results of the current performance improvement intervention and the data from the comparison accounts, there is room for organization-wide improvement in handling damaged shipments. An organization-wide implementation of the intervention used with the target customer in this study might help prevent damaged shipments from being delivered to all end customers, but the volume of shipments moved by NAL would make this time prohibitive because only the very largest of customers have dedicated account managers that oversee just that account and can devote the time to fax and manage the checklists. It simply would not be time or cost-effective to do this for every
shipment because a majority of shipments move without incurring any damage. It may be desirable for certain customers with high damage to movement ratio, but if the customer doesn’t state a problem with damages, the company isn’t going to invest the time and resources to utilize this checklist process.

Finally, these results suggest that it is possible to save millions of dollars with a simple intervention package decided on and implemented literally overnight during a crisis. There was no lengthy performance analysis phase in this project, during which time was spent identifying possible causes of the problem. The absence of a time-consuming analysis phase may be unusual in HPT projects, but it can be attributed to the fact that I have worked in NAL for 12 years, and have intimate knowledge of the organization and its processes. Therefore, it was possible to design a “best guess” solution to the problem immediately to deal with the crisis presented by a client threatening to terminate their account. This project shows that, given the right mix of performer-level behavior change elements (the job aid) and systems-level change elements (the revised communication process), enduring cost-beneficial improvement in performance can be obtained.
## Table 1

*Experimental Account Shipment Data - January 1, 2001-January 31, 2003*

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
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*Intervention Introduced*

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<th>Month</th>
<th>Total Shipments</th>
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<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
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</thead>
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<td>247</td>
<td>239</td>
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<tr>
<td>9/1/2002</td>
<td>409</td>
<td>399</td>
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<td>10/1/2002</td>
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<td>0</td>
<td>9</td>
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<tr>
<td><strong>Sub-total</strong></td>
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<td><strong>130</strong></td>
<td><strong>2.7%</strong></td>
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<td><strong>Totals</strong></td>
<td><strong>8322</strong></td>
<td><strong>8146</strong></td>
<td><strong>17</strong></td>
<td><strong>159</strong></td>
<td><strong>2.1%</strong></td>
</tr>
</tbody>
</table>
Figure 1

Experimental Account- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver

![EA Damages Handled Correct/Incorrect Diagram](image)

Figure 2

Experimental Account- Total Number of Shipments Handled by the NAL Driver

![EA Total Shipments Diagram](image)
Table 2

Comparison Account 1 Shipment Data- January 1, 2001-January 31, 2003

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
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<tr>
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Intervention Introduced

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<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
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<td><strong>29</strong></td>
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<td><strong>7094</strong></td>
<td><strong>18</strong></td>
<td><strong>46</strong></td>
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34
Figure 3

Comparison Account 1- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver

Figure 4

Comparison Account 1- Total Number of Shipments Handled by the NAL Driver
Table 3

Comparison Account 2 Shipment Data - January 1, 2001-January 31, 2003

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2001</td>
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<td>64</td>
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<td>0</td>
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</tr>
<tr>
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<td>80</td>
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<td>0</td>
<td>0.54%</td>
</tr>
<tr>
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<td>81</td>
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<td>0.54%</td>
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<tr>
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<td>2</td>
<td>0.54%</td>
</tr>
<tr>
<td>5/1/2001</td>
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<td>97</td>
<td>0</td>
<td>1</td>
<td>0.54%</td>
</tr>
<tr>
<td>6/1/2001</td>
<td>98</td>
<td>97</td>
<td>0</td>
<td>1</td>
<td>0.54%</td>
</tr>
<tr>
<td>7/1/2001</td>
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<td>126</td>
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<td>0</td>
<td>0.54%</td>
</tr>
<tr>
<td>9/1/2001</td>
<td>80</td>
<td>80</td>
<td>0</td>
<td>0</td>
<td>0.54%</td>
</tr>
<tr>
<td>10/1/2001</td>
<td>129</td>
<td>129</td>
<td>0</td>
<td>0</td>
<td>0.54%</td>
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<td><strong>5</strong></td>
<td><strong>0.54%</strong></td>
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Intervention Introduced

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<tr>
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<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
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</thead>
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<td>12/1/2001</td>
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<td>0.47%</td>
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<tr>
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</tr>
<tr>
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<tr>
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<td>0</td>
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</tr>
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</tr>
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</tr>
<tr>
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<td>0.47%</td>
</tr>
<tr>
<td>12/1/2002</td>
<td>194</td>
<td>192</td>
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<td>0.47%</td>
</tr>
<tr>
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</table>
Figure 5

Comparison Account 2- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver

Figure 6

Comparison Account 2- Total Number of Shipments Handled by the NAL Driver
<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
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<tr>
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<td></td>
</tr>
<tr>
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<td>334</td>
<td>333</td>
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<tr>
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<td><strong>3</strong></td>
<td><strong>0.21%</strong></td>
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</table>

**Intervention Introduced**

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<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
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<tr>
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<td>0</td>
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<td><strong>3</strong></td>
<td><strong>7</strong></td>
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<td><strong>8150</strong></td>
<td><strong>7</strong></td>
<td><strong>10</strong></td>
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</tbody>
</table>
Figure 7

Comparison Account 3- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver

Figure 8

Comparison Account 3- Total Number of Shipments Handled by the NAL Driver
## Table 5

*Comparison Account 4 Shipment Data- January 1, 2001-January 31, 2003*

### Comparison Account 4

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>134</td>
<td>133</td>
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</tr>
<tr>
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<tr>
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<td><strong>1628</strong></td>
<td><strong>6</strong></td>
<td><strong>31</strong></td>
<td><strong>2.22%</strong></td>
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**Intervention Introduced**

<table>
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<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
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<td>226</td>
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<tr>
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<tr>
<td>1/1/2002</td>
<td>218</td>
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<tr>
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<tr>
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<tr>
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<td>160</td>
<td>159</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8/1/2002</td>
<td>185</td>
<td>180</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>9/1/2002</td>
<td>225</td>
<td>222</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>10/1/2002</td>
<td>213</td>
<td>210</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>11/1/2002</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>12/1/2002</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1/1/2003</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>2429</strong></td>
<td><strong>2401</strong></td>
<td><strong>2</strong></td>
<td><strong>26</strong></td>
<td><strong>1.15%</strong></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>4094</strong></td>
<td><strong>4029</strong></td>
<td><strong>8</strong></td>
<td><strong>57</strong></td>
<td><strong>1.59%</strong></td>
</tr>
</tbody>
</table>
Figure 9

Comparison Account 4- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver

Figure 10

Comparison Account 4- Total Number of Shipments Handled by the NAL Driver
Table 6

Comparison Account 5 Shipment Data - January 1, 2001 - January 31, 2003

Comparison Account 5

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2001</td>
<td>64</td>
<td>62</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2/1/2001</td>
<td>95</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3/1/2001</td>
<td>111</td>
<td>111</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4/1/2001</td>
<td>78</td>
<td>78</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5/1/2001</td>
<td>131</td>
<td>130</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6/1/2001</td>
<td>124</td>
<td>124</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>7/1/2001</td>
<td>55</td>
<td>55</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>8/1/2001</td>
<td>68</td>
<td>68</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>9/1/2001</td>
<td>41</td>
<td>41</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>10/1/2001</td>
<td>110</td>
<td>109</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sub-total</td>
<td>877</td>
<td>873</td>
<td>1</td>
<td>3</td>
<td>0.46%</td>
</tr>
</tbody>
</table>

Intervention Introduced

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/1/2001</td>
<td>156</td>
<td>155</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12/1/2001</td>
<td>137</td>
<td>136</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1/1/2002</td>
<td>94</td>
<td>93</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2/1/2002</td>
<td>79</td>
<td>79</td>
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<td>0</td>
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</tr>
<tr>
<td>3/1/2002</td>
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<td>0</td>
<td></td>
</tr>
<tr>
<td>4/1/2002</td>
<td>78</td>
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<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5/1/2002</td>
<td>215</td>
<td>215</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6/1/2002</td>
<td>119</td>
<td>117</td>
<td>0</td>
<td>2</td>
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</tr>
<tr>
<td>7/1/2002</td>
<td>85</td>
<td>85</td>
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<td>0</td>
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</tr>
<tr>
<td>8/1/2002</td>
<td>43</td>
<td>40</td>
<td>1</td>
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</tr>
<tr>
<td>9/1/2002</td>
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<td>86</td>
<td>1</td>
<td>0</td>
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</tr>
<tr>
<td>10/1/2002</td>
<td>96</td>
<td>96</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>11/1/2002</td>
<td>301</td>
<td>298</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12/1/2002</td>
<td>220</td>
<td>217</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1/1/2003</td>
<td>61</td>
<td>59</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sub-total</td>
<td>1942</td>
<td>1924</td>
<td>5</td>
<td>13</td>
<td>0.93%</td>
</tr>
<tr>
<td>Totals</td>
<td>2819</td>
<td>2797</td>
<td>6</td>
<td>16</td>
<td>0.78%</td>
</tr>
</tbody>
</table>
Figure 11

Comparison Account 5- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver

![Comp 5 Damages Handled Correct/Incorrect](image)

Figure 12

Comparison Account 5- Total Number of Shipments Handled by the NAL Driver

![Comp 5 Total Shipments](image)
Table 7

Comparison Account 6 Shipment Data- January 1, 2001-January 31, 2003

Comparison Account 6

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2001</td>
<td>112</td>
<td>112</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2/1/2001</td>
<td>87</td>
<td>87</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3/1/2001</td>
<td>105</td>
<td>105</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4/1/2001</td>
<td>82</td>
<td>82</td>
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<td>0</td>
<td></td>
</tr>
<tr>
<td>5/1/2001</td>
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<td>65</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
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<td>90</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>7/1/2001</td>
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<td>107</td>
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<td>0</td>
<td></td>
</tr>
<tr>
<td>8/1/2001</td>
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<td>2</td>
<td></td>
</tr>
<tr>
<td>9/1/2001</td>
<td>160</td>
<td>160</td>
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<td>0</td>
<td></td>
</tr>
<tr>
<td>10/1/2001</td>
<td>231</td>
<td>228</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>Sub-total</td>
<td>1244</td>
<td>1238</td>
<td>3</td>
<td>3</td>
<td>0.48%</td>
</tr>
</tbody>
</table>

Intervention Introduced

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Shipments</th>
<th>Non-Damaged</th>
<th>Damaged Handled Incorrectly</th>
<th>Handled Correctly</th>
<th>Damages as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/1/2001</td>
<td>202</td>
<td>200</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>12/1/2001</td>
<td>177</td>
<td>176</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
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<td>240</td>
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<td>0</td>
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<tr>
<td>2/1/2002</td>
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<tr>
<td>3/1/2002</td>
<td>249</td>
<td>249</td>
<td>0</td>
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</tr>
<tr>
<td>4/1/2002</td>
<td>265</td>
<td>265</td>
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</tr>
<tr>
<td>5/1/2002</td>
<td>360</td>
<td>359</td>
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<td></td>
</tr>
<tr>
<td>6/1/2002</td>
<td>301</td>
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<td></td>
</tr>
<tr>
<td>7/1/2002</td>
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<td></td>
</tr>
<tr>
<td>8/1/2002</td>
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<td>0</td>
<td></td>
</tr>
<tr>
<td>9/1/2002</td>
<td>292</td>
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</tr>
<tr>
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<tr>
<td>11/1/2002</td>
<td>273</td>
<td>271</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12/1/2002</td>
<td>226</td>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>1/1/2003</td>
<td>261</td>
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</tr>
<tr>
<td>Sub-total</td>
<td>4084</td>
<td>4071</td>
<td>3</td>
<td>10</td>
<td>0.32%</td>
</tr>
</tbody>
</table>

Totals 5328 5309 6 13 0.36%
Figure 13

*Comparison Account 6- Number of Damaged Shipments Handled Correctly and Incorrectly by the NAL Driver*

![Graph showing the number of damaged shipments handled correctly and incorrectly by the NAL driver over time.](image)

Figure 14

*Comparison Account 6- Total Number of Shipments Handled by the NAL Driver*

![Graph showing the total number of shipments handled by the NAL driver over time.](image)
Cargo Checklist.

CARGO CHECKLIST
This form is to accompany cargo from origin to destination. All items have been verified at origin. Destination is to complete PRIOR to delivery to customer. Failure to comply will result in claim action being taken against the station/agent.

CARGO IS NOT TO DELIVER IF ANY INDICATION OF DAMAGE IS EVIDENT!!
Call Acct. Manager IMMEDIATELY @ XXX-XXX-XXXX to report ANY and ALL damages!!
Completed checklists from ORG and DST are to be faxed to:
Attn: Account Manager @ XXX-XXX-XXXX

House Airway Bill: __________________ Units Shipped/Damaged: ____ / ____
Carrier Master Bill: ________________ Accs. Shipped/Damaged: ____ / ____

Origin Dock: [ ] SFO [ ] IAH
Number shock watches: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___
Number activated: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___
Number of tilt watches: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___
Number activated: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___

Instrument: Condition (wooden crate/fiberboard box): [ ] Excellent [ ] Good [ ] Poor
Accessory boxes: [ ] Excellent [ ] Good [ ] Poor

Is unit missing any legs? / If Yes, How many? [ ] No [ ] Yes- ______

NOTE ANY signs of damage: (If damage is discovered cargo is to be held)

___________________________________________
Signature of Inspector:

Destination Dock (Agent/Station):

Number shock watches: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___
Number activated: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___
Number of tilt watches: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___
Number activated: [ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] ___

Instrument: Condition (wooden crate/fiberboard box): [ ] Excellent [ ] Good [ ] Poor
Accessory boxes: [ ] Excellent [ ] Good [ ] Poor

Is unit missing any legs? / If Yes, How many? [ ] No [ ] Yes- ______

NOTE ANY signs of damage: (If damage is discovered cargo is to be held)

___________________________________________
Signature of Inspector:

Cargo Checklist REV. 030104
Revised: 3/1/2004 11:21 AM
Figure 16

"Is" Process Map

Cross-Functional Process Map- Is
"Should" Process Map

Cross-Functional Process Map- Should

Shipping Process

Call for Pickup

Pickup Request Received

Pickup Alert Received (ORG)

Pickup Alert Received (DST)

Pickup Alert Received (ORG)

Driver Dispatched (ORG)

Shipment Picked Up at Shipper Location (ORG)

Shipment Tendered to Carrier (ORG)

Shipment Received (ORG)

Shipment Delivered to Consignee Per Instructions (DST)

Full Completed Checklist Received

Full Completed Checklist Received

Driver must always notify Dispatcher of his status whether shipment is damaged or not.

Deliver on Arrival?

No

Yes

Shipment Returned to Dock or Held Per Account Manager (DST)

Shipment Delivered to Consignee Per Instructions (DST)

Notified of Damage (ORG)

Shipment & MAWB

Shipment & Paperwork

Completed Checklist

Checklist Received from Driver and Faxed to DST

Checklist for Completion by DST Driver Fully Completed

Completed Checklist

Completed Checklist

Completed Checklist

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