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Humanitarian Logistics: Shipping Designs for the Post Disaster Cargo Surge

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HUMANITARIAN LOGISTICS: SHIPPING DESIGNS FOR THE POST DISASTER CARGO SURGE

THESIS

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Abstract

In 2017 Hurricane Maria devastated Puerto Rico. The humanitarian aid community scrambled a response to support the 3.4 million people affected by the disaster. In response, thousands of shipping containers filled with supplies were sent to the island. Numerous reports surfaced regarding significant delays in receiving the shipments. This research reviews the historical account of cargo throughput into Puerto Rico following Maria. A computer simulation built in ARENA compares various what-if scenarios based on empirically collected data and interviews with FEMA, port authorities, and commercial cargo carriers to determine how the humanitarian supply chain could improve for future disaster planning. An additional goal of this research is to better inform humanitarian logisticians who must balance near-term disaster response demands with long term recovery concerns.

To my Beloved Wife, Children, and the Victims of Hurricane Maria

Acknowledgments

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HUMANITARIAN LOGISTICS: SHIPPING DESIGNS FOR THE POST DISASTER CARGO SURGE

I. Introduction

The Location

Puerto Rico is a U.S. territorial island in the western North Atlantic Ocean. There are approximately 3.4 million people on the island (US Census Bureau, 2018). The median household income in Puerto Rico is $19,343, much lower than the U.S. median of $60,336 (US Census Bureau, 2018). The territory's primary exports are pharmaceuticals, chemicals, and medical equipment (US Census Bureau, 2019). By early 2017 the public utilities were considered degraded from limited funding and a dilapidated infrastructure (Dooley, 2017). The island relies completely on maritime imports to sustain energy and to stock general commodities. These imports are processed through one major seaport on the north side of the island in the city of San Juan. There is a second major port on the south side of the island in the city of Ponce that is inactive, and a terminal on the east side of the island in Yabucoa for energy imports. The port of San Juan acts as the primary lifeline for all of the island's basic commodity needs.

The 2017 Hurricane Season

Historically, Puerto Rico has been affected by hurricanes about every 3.4 years, and directly hit by a major hurricane every 20 years (Williams, 2018). On September 20th of 2017, Puerto Rico was hit head on by Hurricane Maria, a category 4 hurricane,

which crawled across the island over a two-day period. The island's entire population of 3.4 million people were affected by the storm (World Vision Staff, 2018). Some people were affected by the loss of public utilities, some displaced from their homes indefinitely, and over a thousand people were killed (Kessler, 2018).

Hurricane Maria was one of three major hurricanes to affect the U.S. during the 2017 hurricane season (Vaccaro, 2017). Hurricanes Harvey, Irma, and Maria all struck U.S. populations within a few months of each other. Harvey struck Texas on August 25th. Irma struck the Virgin Islands on September 6th and Florida on September 10th. Maria struck Puerto Rico on the September 20th. Additionally, four other large storms hit the U.S. during this same busy season (Vaccaro, 2017). In their 2017 Hurricane Season After Action Report, the Federal Emergency Management Agency stated,

> "The fact that these historic storms occurred concurrently and were followed by the California Wildfires presented an unprecedented scale of operations, extremely complex logistics, and numerous novel challenges across the Nation" (FEMA, 2018:1).

As Hurricane Irma passed Puerto Rico in the beginning of September, much of the local humanitarian aid safety stock on island was dispatched to support the survival and recovery efforts going on in the nearby Virgin Islands and elsewhere in the continental United States. By the time Hurricane Maria hit on September 20th, an estimated 80,000 people were still without electricity and trying to recover from Hurricane Irma. Roughly fourteen days after Hurricane Irma, Maria struck Puerto Rico head on.

Considered the worst natural disaster to affect Puerto Rico in the last 80 years, Hurricane Maria crawled across the island, ripping it apart with winds up to 155mph

(World Vision Staff, 2018). The hurricane made landfall in the south east corner of the island and moved across the center of the island toward the northwest corner (Pasch, Penny, & Berg, 2017). Several shipping vessels inbound to Puerto Rico were forced to redirect out of the hurricane's path (Green, 2018). Mudslides, trees, powerlines and debris covered the roadways which temporarily shut down the island's distribution network. Many of the businesses who rely on large shipments of commodities from the port of San Juan were temporarily unable to receive shipments, due to the businesses' lack of power to refrigerate items or degraded facilities that were not fit for warehousing (Green, 2018).

The island's transportation network was temporarily crippled. After Hurricane Maria an island wide fuel shortage ensued and cars were lined up at gas stations waiting for their turn to get fuel for hours on end (Lubben, 2017). This in turn meant trucking fleets could not operate at full capacity and drivers couldn't report to work during a critical time for supply distribution. Shipping companies brought mobile laundromats, meals, kitchens, water, blankets, and other care packages and supplies for their employees and families in order to keep the sea ports running full time (Green, 2018).

Given the setbacks affecting the transportation system in and around Puerto Rico directly after Hurricane Maria, media reports began to surface claiming that the delivery of humanitarian aid was shamefully slow (HCMG Editorial, 2017). Patients were in need of medical supplies and a number of Puerto Rican residents were running out of food and water which added stress to the situation (Simon et al., 2017). Many of these people wondered where the humanitarian aid supplies had gone. Meanwhile, at the port of San Juan, a representative from one of the local shipping companies pointed out a bottleneck

in the system by highlighting that there were an estimated ten thousand containers of supplies sitting at the port filled with food, water, and medicine (Gillespie et al., 2017). Thousands of containers were indeed sitting in the port of San Juan awaiting delivery (Green, 2018). Normal freight had been accumulating while awaiting the hurricane's passage. Additionally, a surge of freight to replenish what was forecasted in sales from the disaster was inbound. Furthermore, humanitarian aid organizations began pushing relief supplies to the island. The simultaneous increases of inbound freight and inbound humanitarian aid to Puerto Rico was beginning to show, but many wondered why the freight was not leaving the port as fast as it was arriving.

The major sea freight shipping companies operating out of the port of San Juan unanimously agreed that freight was not being picked up by the consignees, or end user customers, nearly as fast as they were prior to the hurricane (Green, 2018). This transportation delay will be referred to later in the research as customer availability. The problem many of the businesses faced after the hurricane was reopening without power, with damaged facilities, and/or with a limited staff. No power meant an inability to keep refrigerated goods cold, and damaged facilities meant decreased room and security for warehousing inventory. Thus, the port of San Juan inadvertently turned into a satellite storage facility for many businesses who were not ready to receive their inbound shipments (Green, 2018). Businesses who could receive shipments faced the dilemma of not having enough trucks and drivers available to pick up their goods from the port. Many of the drivers were still putting their homes back together and getting their families situated. Additionally, widespread fuel shortages limited the amount of deliveries that could be completed.

The Disaster Response

FEMA is America's leading governmental organization for disaster relief. FEMA anticipated the combined danger of Hurricane Maria's timing behind Hurricane Irma and the quickly depleting safety stock of humanitarian supplies they had remaining on the island of Puerto Rico. Thus, FEMA began shipping humanitarian relief supplies prior to Maria's impact (Green, 2018). However, with the magnitude of damage and overwhelming number of people affected, the humanitarian aid community had to quickly respond to a much larger than anticipated demand for relief.

Shipping humanitarian supplies to Puerto Rico was no easy feat for the continental United States based humanitarian organizations to complete. Recent shipments within the continental U.S. to disaster victims of hurricane Harvey in Texas, or Hurricane Nate in Mississippi had been a much simpler task. For example, if FEMA were to ship a truckload of food and water to Mississippi, it would have a truck pick up the supplies from one of their warehouses, and then send the truck to the federal or regional state-owned staging area. To ship the same truck load of supplies to Puerto Rico, the supplies are trucked from a federal warehouse and then to the port of Jacksonville Florida. The supplies are containerized when a container is made available. The container is then loaded onto a vessel when a vessel becomes available, followed by a five to six-day transit time. Once the vessel arrives at the port of San Juan in Puerto Rico, the vessel is then offloaded, where the container waits in the yard for another truck to deliver it. Once a truck and driver are available, the container is loaded onto the truck and then dispatched to a federal staging area. At the federal staging area, the container can be unloaded and the supplies can be broken down into smaller straight trucks. The straight

trucks are then sent to regional staging areas owned by the state, at which point the state decides which delivery site needs supplies the most and distributes accordingly. The key point is that the total number of touch points required to get humanitarian supplies to the intended destination increases when shipping to an island versus within the mainland. Thus, added opportunities for delivery delays occur.

The Research Question

The reacting surge of humanitarian aid supplies took longer than desired to reach the intended recipients. The disaster response phase continued for several months as back-to-back shipments of food, water, blue tarp roofing, fuel, service vehicles, and other supplies were being coordinated out of the port of Jacksonville, Florida (Green, 2018). As the disaster response phase slowly evolved into the recovery phase, statements were surfacing across the media that implied the humanitarian aid community was handling the aftermath of Hurricane Maria poorly. Example headlines included: "Puerto Rico aid is trapped in thousands of shipping containers" (Gillespie et al., 2017), "…Logistical Failings Have Stalled Hurricane Maria Recovery Efforts" (SupplyChainX, 2018), and "Logistics Challenges Hinder Hurricane Maria Recovery" (APICS, 2017). Over a year later humanitarian aid organizations have continued to assist the island in recovery efforts. The extensive lead times involved in the delivery of humanitarian aid has led to the following research question: How did the supply chain design and carrier choice affect the delivery of humanitarian response and recovery cargo after Hurricane Maria?

Answering this research question will help prepare Puerto Rico for future disaster response and recovery. Also, the research question applies to other island territories who

face similar logistical struggles during the disaster response and recovery phases. Furthermore, answering the research question will assist FEMA in achieving their goals for logistics improvement as explained in the FEMA 2017 hurricane season after action report. The objectives of the report were to increase transportation planning, management, and contract support capacities, quickly deliver key commodities, streamline movement across multiple modes of transportation that facilitate and speed recovery, and develop a more comprehensive understanding of supply chains to support rapid restoration to catastrophic incidents (FEMA, 2018).

A simulation analysis was chosen to answer the research question. In order to build the simulation, the supply chain in and around the Port of San Juan in Puerto is examined. The research focuses on maritime shipments, which comprised the bulk of the disaster response cargo. The goal of the research is to derive conclusions as to how the humanitarian supply chain timeline could have been improved.

The paper will continue with a literature review of relevant topics surrounding the research question, methodology, and how the methodology was employed for this research. The research results and analysis will then be discussed. Lastly, the paper ends with conclusions and recommendations based on empirical data gathered in Puerto Rico, available literature, and the simulation's quantitative output.

II. Literature Review

The literature review will first explain the disaster management continuum of recovery. Supply chain improvement and success measures will then be discussed, followed by considerations within the context of humanitarian logistics. Next, FEMA's disaster management tactics and capabilities are reviewed with respect to Hurricane Maria. Lastly, literature about the simulation methodology is discussed.

The Continuum of Recovery

Two of the core phases in any disaster management model include disaster response and disaster recovery. This research focuses on those two phases in particular and their logistical impact surrounding the event of Hurricane Maria. Carter (2008) explains that a response phase consists of measures taken immediately prior to and following disaster impact that are directed toward saving life and protecting property. Carter (2008) goes on to explain that unlike the response phase, the recovery phase is a longer process marked by restoration, rehabilitation, and reconstruction efforts. It is important to note that in this research the response and recovery phases are both involved in the data used, since the two phases often overlap one another. As the response or rescue phase draws down, the longer-term community recovery efforts ramp up. The overlap of the response and recovery phases is illustrated in Figure 1.

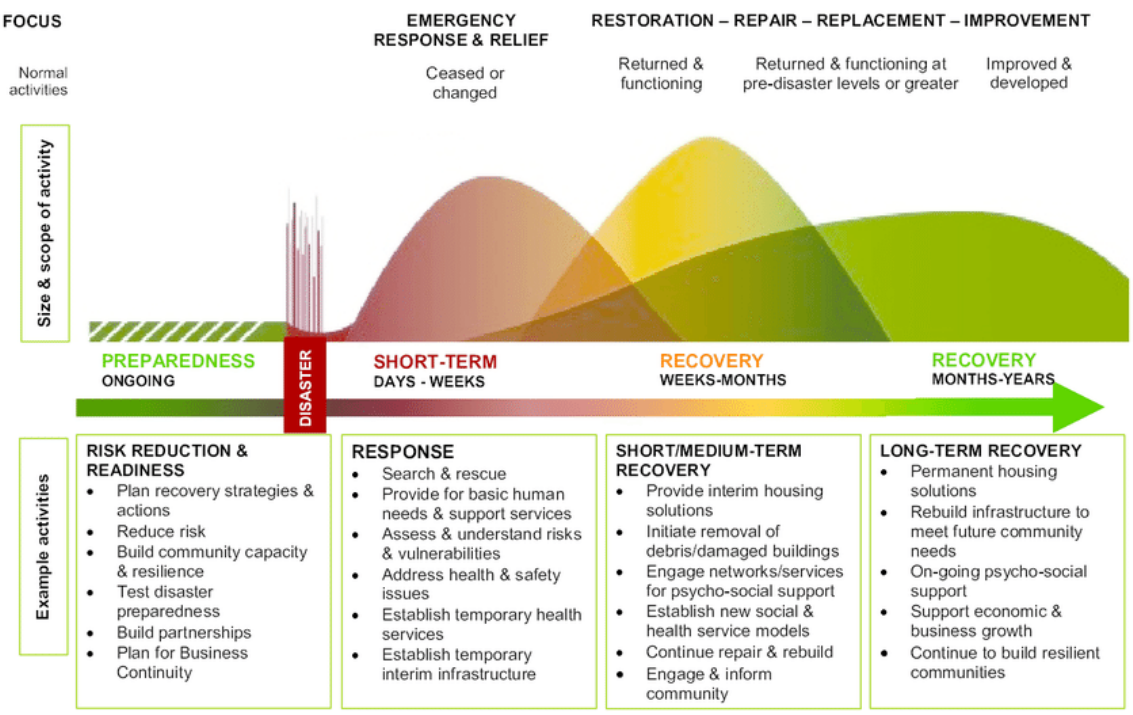


Figure 1. Continuum of Recovery (MacDonald et al., 2015)

Supply Chain Improvement

The supply chain "is an essential part of humanitarian aid operations" (Agostinho, 2013:210). Supply chains are composed of several chain links of suppliers and providers. To answer the research question of how a supply chain could be improved, one must first ask what makes a humanitarian supply chain successful? Yadav & Barve (2015) claim that the 'agile humanitarian supply chain' is an indication of the most successful supply chains, which builds on the shoulders of continuous process improvement systems. Agile can be defined as "the ability of a supply chain to rapidly respond to changes in market and customer demands" (Jain, Benyoucef, & Deshmukh, 2008:367). This is in part achieved by way of data analysis and forecasting of demand. However, customer demands during the response phase can be very difficult to estimate. Beamon (1999)

proposes three measures to assess a supply chain's performance that will be adapted for this study: resource measures (R), output measures (O), and flexibility measures (F). Resource measures will be assessed in this study as queue lengths and times, output measures will be assessed as the total volume of freight moving through the supply chain, and flexibility measures will be assessed as the supply chain's reaction to change.

One option for improving delivery times during the response phase is to have safety stock in prepositioned warehouses. Prepositioning inventory "can enhance the responsiveness of relief chains, but decrease the cost-efficiency because of high inventory costs" (Ali Torabi, Shokr, Tofighi, & Heydari, 2018:143). At the time of Hurricane Maria FEMA owned a warehouse for pre-positioned inventory in Puerto Rico. However, the inventory was depleted two weeks prior to Maria to support the victims in the Virgin Islands impacted by Hurricane Irma. With respect to the research question for this study, pre-positioned inventory would expedite the delivery of supplies during the response phase. As of early 2019 FEMA is reportedly looking to open more warehouses with pre-positioned inventory in the Puerto Rican area to better prepare the Caribbean region for future disaster-prone seasons. Therefore, this research will focus more on the transportation between supply nodes during the response and recovery phases, and how that can be improved based on the case of Hurricane Maria as an isolated event.

Hurricane Maria's Logistics

A 2017 report out of MIT highlighted some of the various components involved in Hurricane Maria's post disaster logistics timeline in the following statement: "Drivers, trucks, containers, roads, telecommunications, fuel, power, and more were all equally-

important elements in the system. Shortages or reduced capacity in any of these subsystems created shortages or reduced capacity for the entire system" (Goentzel et al., 2017:11). The idea of reducing throughput capacity in one subsystem affecting capacity for the entire system is derived from the Theory of Constraints (TOC). TOC involves defining a system's goal, performance measures, and constraints, and then seeks to optimize the system by leveraging those features (Goldratt & Cox, 2014). The TOC is a lens through which this research's method will be built. The identification of constraints, or bottlenecks, will be key to the recreation of the historical account of aid shipments to Puerto Rico. Transportation bottlenecks such as port processing capacity, weather delays for vessels, vessel capacity, road delivery delays, and customer availability are all considered in the method design.

FEMA's primary logistical mission is to, "deliver the right resources to the right place at the right time in support of state, local, tribal governments and territories" (FEMA, 2015:1). "Saving lives takes priority and, given the unknown scale of any event in the early hours, it makes sense to estimate worst-case demand for relief supplies" (Goentzel et al., 2017:10). FEMA accomplishes a big, fast, and smart response by way of pre-negotiated contracts with logistics and commodity providers in order to meet the relative surge demands of a given disaster. Additionally, FEMA maintains caches of safety stock that are ready to distribute but does not maintain their own trucking or maritime logistics fleets. During the surge of disaster response, a large amount of transportation capacity is needed, which is the area of focus for this research. FEMA did not have a surge fleet available to call on during Hurricane Maria. Thus, FEMA was wholly reliant on the available maritime shipping carriers that service Puerto Rico.

Transportation is left to the private sector experts who execute transportation functions daily with their pre-established routes and infrastructure. Humanitarian organizations are recommended to take a supervisory role instead of running the transportation network (Wang, Wu, Liang, & Huang, 2016). This research reviews the major transportation providers available during the event of Hurricane Maria with respect to the delivery of humanitarian aid to Puerto Rico.

Computer Simulation Analysis

This research was conducted using a quantitative approach through a computer simulation. Empirical data was collected to inform the simulation model and to interpret the simulation results. The simulation serves as the major component of data analysis. Simulations are ideal for exploring the relationships between variables (Chandrasekaran, Linderman, & Sting, 2018). The simulation method in research provides a cost-effective means of testing hypothetical scenarios, especially in this case with a large supply chain containing multiple transportation providers over land and ocean. Simulation is used to "investigate a wide variety of what if questions about the real-world system" (Banks, et al., 2010:3). Simulations are subject to their scope and limitations, but "are a good starting point in any planning process" (Banomyong & Sopadang, 2010:720). The results of this simulation could be considered in the humanitarian aid community's planning process in preparation for future disaster seasons. Simulations are also "one of the most widely used operations-research and management-science techniques, if not the most widely used" (Law & Kelton, 1991:2). When exact information can be acquired, an analytical study can be used with mathematical methods (Law & Kelton, 1991).

However, the real-world system being modeled in this research is complex, and the data acquired are estimates from experts. Thus, instead of mathematical methods, a simulation becomes an ideal methodology to employ in this case.

Literature Summary

Response and recovery are two distinct phases of disaster management that overlap. Supply chains are essential to humanitarian operations. Increasing safety stock, pre-positioned inventory, and awareness of the supply chain as a whole are typical actions to improve responsiveness. FEMA's tactic during disaster response is to surge. Transportation requirements are normally fulfilled by to the private sector. Finally, the research approach is a simulation used to explore alternative scenarios.

III. Methodology

The methodology begins by outlining the data collection process. Interviews laid the foundation for the simulation process map and data points. The historical context through the eyes of the interviewees is captured to best interpret the results of the simulation. The simulation's mechanics are then explained. The simulation's assumptions, limitations, and intended features in recreating the historical account are highlighted throughout the chapter. Lastly, scenarios designed for testing within the model are delineated.

Data Collection

The data collection process was initialized through a contact with FEMA headquarters in Washington, DC. The simulation method was chosen to examine the entirety of the historical account in motion and to compare values. A draft simulation model was created based on available information on the web about the port of San Juan in Puerto Rico, the port of Jacksonville in Florida, and from sea port research by Franzén & Streling (2017). The simulation was developed using Arena simulation software (Rockwell Automation, 2019). Contact was then made with the FEMA personnel in Puerto Rico to discuss the best way to collect empirical data to refine and inform the model. A list of stakeholders was generated surrounding the humanitarian logistics of Hurricane Maria and forwarded to the FEMA Puerto Rico logistics team as shown in Table 1. Attempts were made by both FEMA and the researcher to make contact with all parties listed.

Table 1. Interview Contact List

Process Role	Contacts	Interviewed
Alternate port	Port of the Americas Authority - Ponce	X
Carrier	Crowley	X
Carrier	NYK	
Carrier	Tote	X
Carrier	Trailer Bridge	X
Disaster management	FEMA Puerto Rico logistics team	X
Disaster management	State Disaster Management Agency	
Land distribution	Transportation and Freeway Authority	
Land distribution	National Guard	X
Port	Maritime Transport Authority	
Port	Port Authority - San Juan	X
Port of origin	JAX	

Meetings were held in the FEMA operations center in Puerto Rico in December of 2018. Empirical data was collected using written notes and guided discussions from the simulation model. Suggested edits and data estimates for the simulation model were acquired. Specific details of the methodology and data collection process can be found in the appendices.

Data Findings

The entities in this simulation are shipping container Twenty-foot Equivalent Units (TEUs). Note that many of the containers shipped to Puerto Rico are actually 53' foot container trailers, on a Roll On Roll Off (RORO) style barge (Green, 2018). However, the industry representatives interviewed provided container totals that are calculated into TEU equivalents for data consistency.

The three major domestic carriers who service Puerto Rico are TOTE Maritime, Crowley Logistics, and Trailer Bridge. There are other international carriers who service

Puerto Rico as well, but they are excluded from the research due to the Jones Act. The Jones Act requires that vessels traveling between two US ports be U.S. flagged, owned, and crewed (66th U.S. Congress, 1920). In the interviews it was reported that the three major maritime domestic carriers servicing Puerto Rico out of the port of Jacksonville, had a divided share of the total throughput of freight as shown in Figure 2.

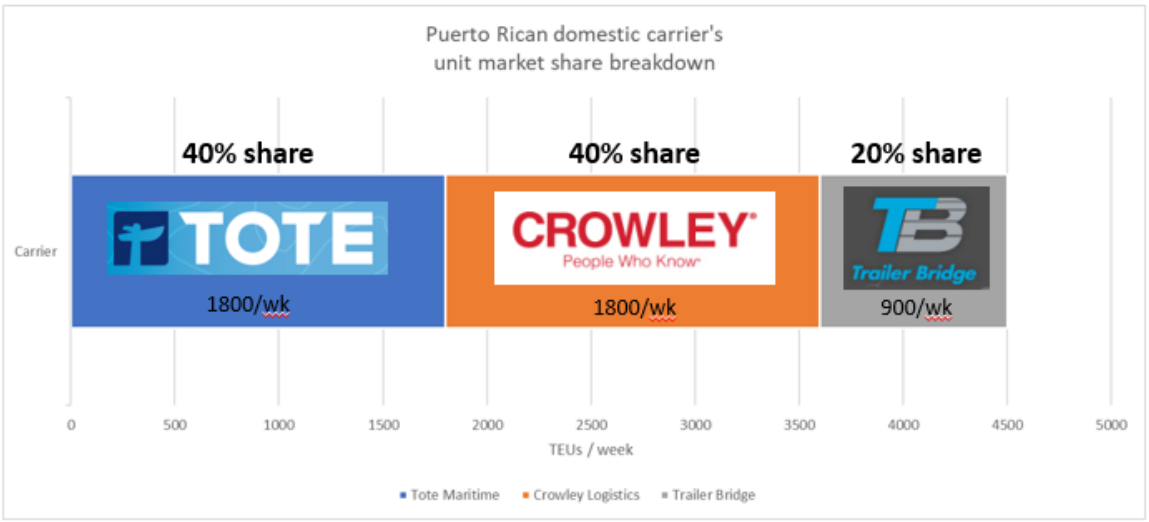


Figure 2. Major Domestic Carriers Servicing Puerto Rico

Crowley and TOTE each move an estimated 1800 TEUs per week, and Trailer Bridge moves an estimated 900 TEUs per week. The estimated containers moved per week are used as a baseline for a set of entities called normal freight within the simulation. Normal freight entities, or TEUs are created during the entire simulation and considered the pre-hurricane every day demand flow. When combined, the weekly TEUs moved by all three carrier equalled 4500 TEUs. The division of those 4500 TEUs is considered the unit market share breakdown, shown in Figure 2 as the 40%, 40%, and

20% divided share. This division will be referred to later in the research as the 40/40/20 split.

Immediately after Hurricane Maria, all carriers experienced a 45% increase in TEU throughput, independent of humanitarian aid (HA) TEUs. That normal demand increase then declined and stabilized at a net 20% increase for the next year. The average amount of TEUs carried per vessel, the fleet sizes before and after Hurricane Maria, and the travel time for vessels are all featured in Table 2.

Table 2. Carrier Shipping Data

	Baseline	Baseline increase		Average	Fleet size		Travel from
	Weekly	+ 45%	+ 20%	Batch size	Normal	Increased	JAX (days)
Tote Maritime	1800	2610	2160	900	2	3	2.5
Crowley Logistics	1800	2610	2160	360	5	9	5.5
Trailer Bridge	900	1305	1080	325	2	3	5.5

FEMA's HA cargo was shipped via a pre-negotiated contract with Crowley. Pre-negotiated contracts are common for FEMA, since it is a means to improve responsiveness and sort out many of the contracting details prior to a moment of crisis (Thornton, 2017). HA cargo started flowing to Puerto Rico seven days prior to the hurricane in response to Hurricane Irma and totaled 8000 TEUs.

Modeling

An extensive review of the simulation model was completed upon returning from Puerto Rico. The model was refined to recreate the historical account of Hurricane Maria by modeling the actual supply chain available and incorporating the feedback of interviewees regarding the process model. After adding the actual data points obtained

from the interviews, the model was tuned to produce salient features of the historical event as described by the interviewees.

The simulation model revolves around the concept of entities that enter the system model at a specified arrival rate, and then pass through processes where they seize resources required for process completion while being subject to processing times and queues. Entities encounter conditional rerouting events based on system attributes during the simulation runtime. The system's flow finishes at a disposal on the far-right side of the model where an entity's journey is completed. The simulation run parameters can be set for a specified length and can be run multiple times to compare values and obtain averages.

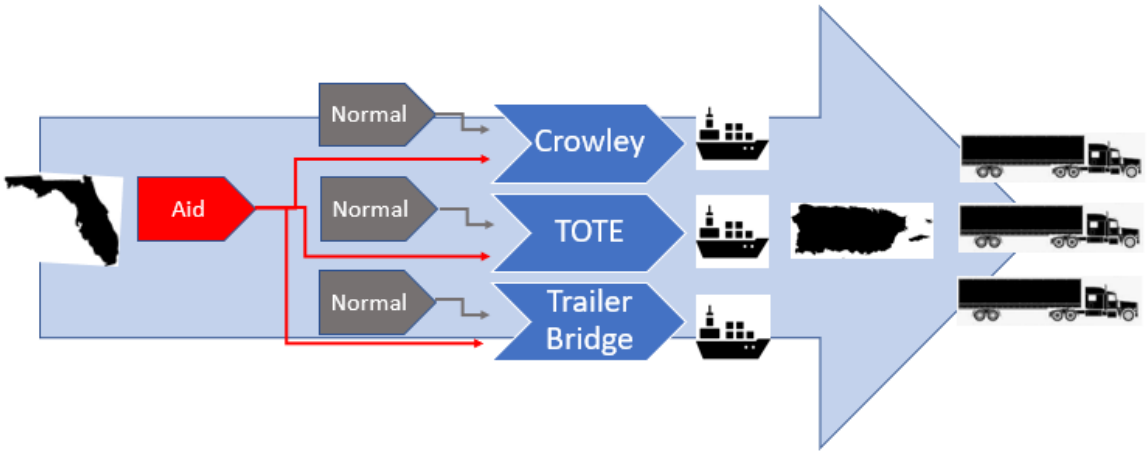


Figure 3. Simulation Model Overview

The overarching process flow for the research simulation designed is depicted in Figure 3**.** The three major carriers each have their own normal demand for cargo modeled within the simulation that is independent of HA cargo. After TEUs from the normal demand enter the system, they queue at the port of Jacksonville in the respective carrier's

yard. The TEUs are then processed into batches and queue to be loaded onto vessels. Once aboard a vessel, TEUs wait the specified transit time from Jacksonville to the port of San Juan in Puerto Rico. Once arriving in Puerto Rico, the TEUs queue to be offloaded from the vessel. When TEUs are processed off of the vessels they then queue to be loaded onto trucks. After a TEU is loaded onto a truck, the truck completes its delivery and the TEU exits the model. HA TEUs follow the same process flow as normal TEUs in the model. However, which carrier HA TEUs are allocated to is adjustable.

Fleet sizes increased one week after the hurricane in response to increased demand. A frequent comment from the carriers, was that they can always find more ships to move containers. They have no concern for total capacity and they will find a way to move the containers assigned to them. Shipping delays were also built into the simulation to model the effects of the hurricane on waterways, roadway obstructions, and customer availability for receiving cargo immediately after the hurricane.

Model Validation

A series of variables was programmed for recording into a spreadsheet to ensure the model recreated the historical account of Hurricane Maria as it was described during the interviews. The variables are recorded daily and measure how many TEUs are in the system, how many TEUs are in each queue, and whether or not a system delay has been activated. The model was tested for one simulated year with 100 replications. The variables were used to verify no infinite queues existed and that salient milestones within the logistical account of Hurricane Maria were being met.

Following model validation that the baseline simulation was reflecting what was understood to be reality, a follow up phone conference was scheduled with the FEMA personnel to validate the model with expert opinion. It was determined in the phone conference that the port of Ponce needed good representation in the model as a possible option for future HA delivery to Puerto Rico. Otherwise, the conversation concluded that the model was meeting all other salient features of the historical event and that after Ponce was added as a shipping option for HA in the model, it would be time to press forward with running tests.

Ponce

The addition of Ponce, also known as the Rafael Cordero Santiago Puerto de las Americas (Google Maps, 2019), was constructed in the model similar to the three major carriers represented. The general idea of Ponce as a shipping option is completely hypothetical at this point. There is no specific data that clarifies Ponce's throughput capacity to the researcher's knowledge. This is due to the fact that Ponce currently has no demand. It is a large and beautiful port that was built as an economic expansion for Puerto Rico that has yet to attract sustained business investments in the local area. There are two gantry cranes in Ponce that were pending maintenance as of the time of the interviews held, a mobile crane, space for 3 vessels, room for 8000 containers when stacked four high, and hook ups for refrigerated containers. The port was open for business the day after the hurricane passed and cleared by the coast guard for business. Lift On Lift Off (LOLO) barges like those owned by Trailer Bridge are able to arrive at ports like Ponce and use their own cranes to unload their own vessels. Crowley was asked

to make some of their deliveries out of Ponce, but after a cost analysis they quickly found it much cheaper to use their own terminal, employees, and equipment out of San Juan and then truck the containers across the island where needed. All carriers interviewed preferred their own terminals over having to operate out of Ponce. It made no sense for the carriers to relocate their sea port operations across the island in terms of cost and efficiency. Military Sealift Command was reported to have berthed several times at Ponce after Hurricane Maria to deliver shipments. The thought of the government using the port of Ponce as an independent location from San Juan during the interviews was deliberated. The discussion led to the speculative conclusion that if the surge of HA TEUs were shipped through Ponce they would not delay shipments intended for economic recovery in San Juan. The use of Ponce as an alternative port would deconflict the two surges of normal TEUs and HA TEUs.

Scenarios Designed for Simulation

Once the model was completed and the baseline simulation results validated with FEMA, several scenarios were designed. The scenarios are shown in Table 3. Scenario run refers to the label of each unique scenario designed for simulation. The incremental changes in the model are highlighted in the next six columns to the right of the scenario labels.

Table 3. Scenarios Designed for Simulation

Scenario Run	Sim duration (weeks)	Hurricane activated	Bayamon opened	HA routing	Road delays	Customer availability
Model validation	52	x	x	Cr 100%	48hrs	40%
0 - base 1 may	12	no	N/A	N/A	48hrs	40%
1 - base 11 sep	12	x	x	Cr 100%	48hrs	40%
2 - no bayamon	12	x	no	Cr 100%	48hrs	40%
3 - HA one third	12	x	no	33/33/33%	48hrs	40%
4 - HA 40/40/20	12	x	no	40/40/20%	48hrs	40%
5 - road delay doubled	12	x	x	Cr 100%	96hrs	40%
6 - customer availability 10%	12	x	x	Cr 100%	48hrs	10%
7 - customer availability 90%	12	x	x	Cr 100%	48hrs	90%
8 - HA through Ponce	12	x	N/A	Po 100%	48hrs	40%

The first simulation created that is labeled model validation was run for 52 weeks to ensure no infinite queues or unrealistic conditions exited. The simulation is then scoped to a twelve week window for a closer comparative analysis among scenario results. Scenario zero was run several months prior to the hurricane to obtain the twelve week baseline data with no hurricane. Scenario one slides the twelve weeks to start a week and a half prior to the hurricane to capture the hurricane and its effects in the historical context. Scenario two looks at what would happen if Bayamon was never made available for Crowley. Scenario three splits the HA shipments evenly among the three major domestic carriers: TOTE, Crowley, and Trailer Bridge instead of 100% to Crowley. Scenario four splits the HA shipments identical to the island's normal freight unit market share breakdown allocating 40% to TOTE, 40% to Crowley, and 20% to Trailer Bridge. Scenario five explores what would happen if road delays for trucks exiting the ports were doubled. Scenario six reduces the percentage of customers able to receive cargo for the first two weeks following the hurricane to 10%, in other words only

10% of cargo leaves the port each day. Scenario seven improves the customer availability for receiving cargo to 90%. Scenario eight routes all HA shipments through Ponce via an external fourth carrier to explore the effect of fully deconflicting HA and normal demand shipments on island. Resulting simulation output for each scenario is discussed in chapter four.

IV. Analysis and Results

The data analysis is conducted with several aims in mind. First, the analysis aims to find differences across the simulation's queues, total inventory levels, and reaction to change. Second, having identified the differences among simulations, the analysis seeks to ultimately answer the research question. Since the data used to inform the simulation is based on general estimates from industry experts, a specific target number of replications was incalculable since no variance could be derived. The first simulation was replicated 100 times. Then, the same simulation was run 25 times and results were nearly identical. All other simulations were likewise run with 25 replications. The simulation output yielded a large amount of data, thus aggregate charts are shown for comparative analysis among simulations. The base data and all other ARENA output are included in the appendices.

Queues

Figure 4 and Figure 5 indicate the wait times and lengths of queues in each scenario. Both figures sum the results of all TEU types within the model. TEU types include normal demand TEUs from Crowley, normal demand TEUs from TOTE, normal demand TEUs from Trailer Bridge, and HA TEUs. Figure 4 compares how many hours a TEU will wait on average in queues during the scenario. Figure 5 compares how many TEUs on average are waiting in a queue during the scenario. Ponce is included as a fourth shipping carrier in all scenarios. Weighted averages take into consideration when Ponce has zero TEUs assigned, so as not to inflate results with added system capacity when Ponce is used. From these two figures we see that TEUs wait in faster and smaller queues

in scenarios three, four, and eight. The summed average queue times are weighted using the following formula:

$$\sum_{i=1}^{j} t_i \left(\frac{n_i}{N}\right) = t_1 \left(\frac{n_1}{N}\right) + t_2 \left(\frac{n_2}{N}\right) \ldots t_j \left(\frac{n_j}{N}\right) \quad (1)$$

Where *t* is the average queue times, *n* is the number in queue, and *N* is the total number in all queues.

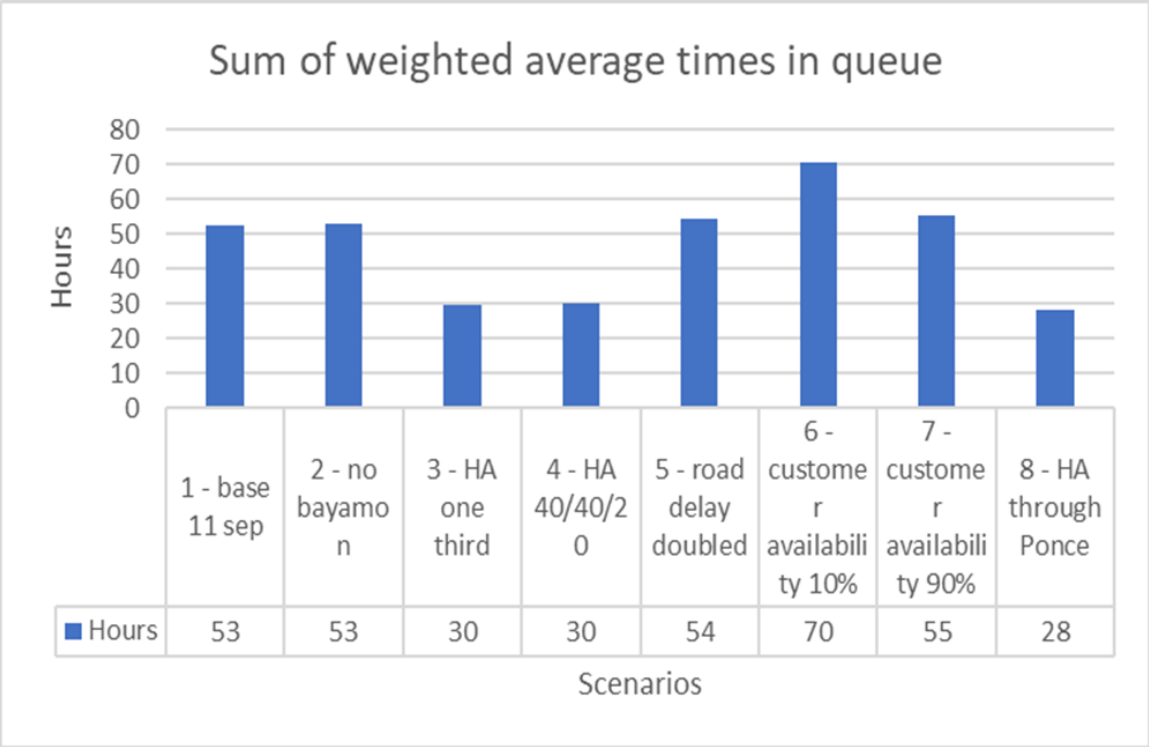


Figure 4. Average Time TEUs Collectively Wait in Queues

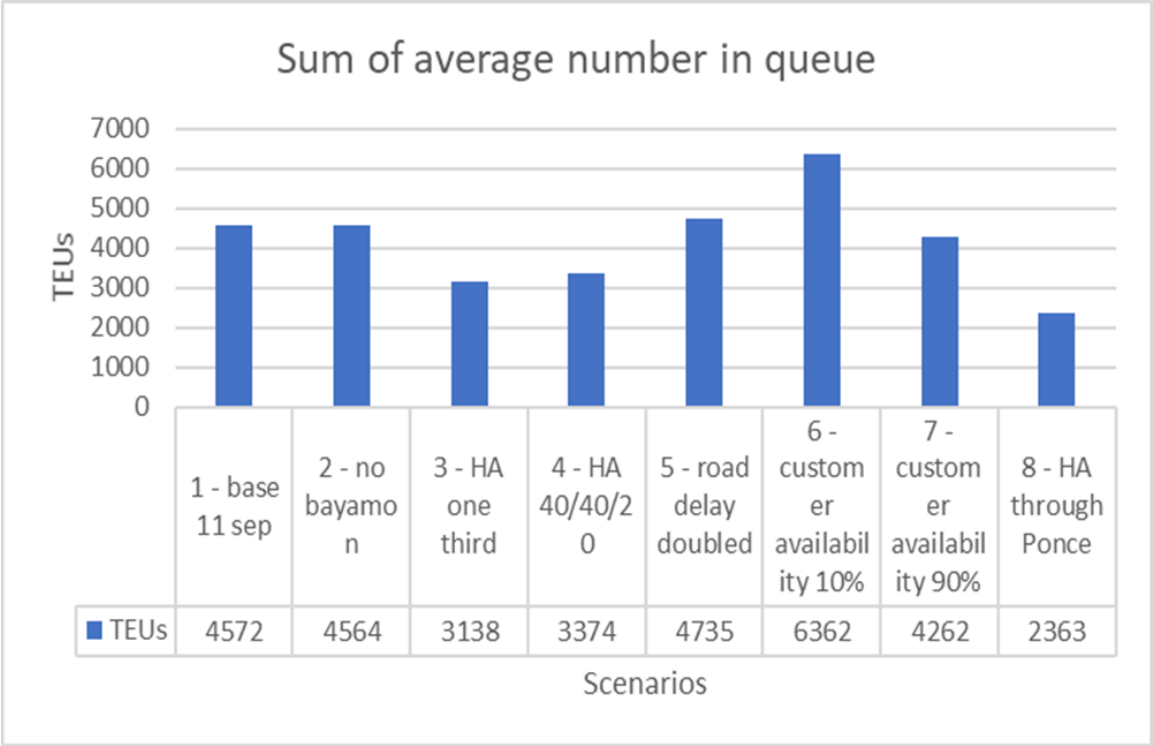


Figure 5. Number of TEUs Collectively Waiting in Queues

Total System Times

Total system times refers to the total amount of time it takes for a TEU to complete shipment. When averages for all TEU total times are weighted for all TEU types combined, there are still distinguishing characteristics among scenarios. Figure 6 shows the average total time that each TEU type takes to process through the entire model. Figure 6 then finds the weighted average for those total times based on how many TEUs each TEU type represents. TEU types can take more or less time than others types to transit the system depending on how busy each carrier or delivery route is within the model. Thus, the totals in Figure 6 highlight how TEUs spend a combined 19-20 hours less during scenarios four and eight to complete their journey on average. Interestingly, scenario seven is comparable to scenario three, indicating that customer availability has a

similar impact to carrier design on overall TEU delivery times. This is also apparent in Scenario six where limited customer availability raises the combined times for TEUs up by an outstanding 61 hours from the base scenario.

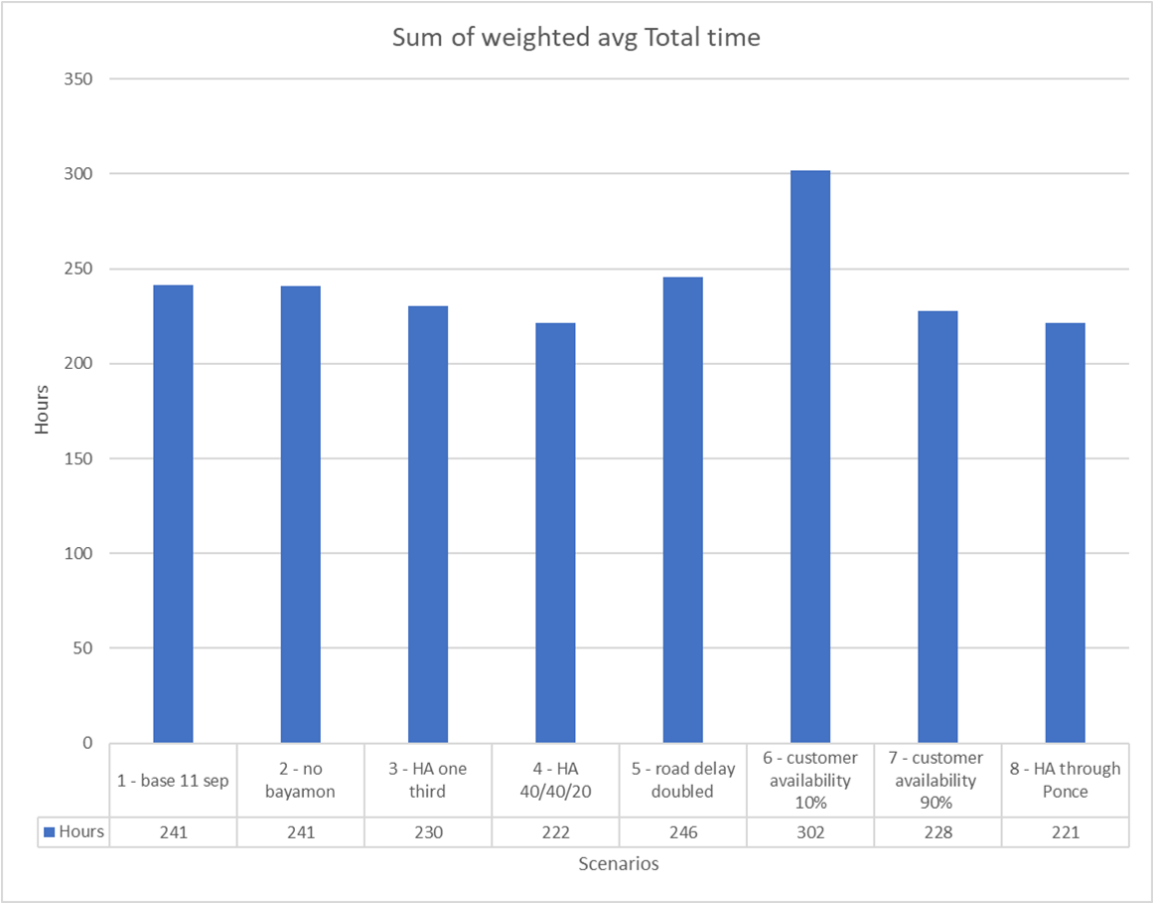


Figure 6. Average Time Required for TEUs to Complete Shipment

Surge Duration

A look at the curve of the TEU surge over time shows how long the system takes to return to a normal steady state. The total amount of all TEUs within a scenario are recorded daily and charted in Figure 7. Scenario one processes the surge and returns to a normal throughput baseline and system inventory level of about 5000-6000 TEUs per day 75 days after the simulation begins. Scenarios two and five are not shown as they do not add value to this analysis. Scenarios three and four return to the throughput baseline 50 days after the simulation begins, 25 days faster than scenario one or almost a month sooner. Scenario three is slightly higher than four. In scenario three the smaller of the three carriers for this simulation, Trailer Bridge, is slightly overwhelmed by the 33% allocation of HA TEUs. In scenario four when Trailer Bridge is allocated 20% of the TEUs commensurate with the normal demand unit market share breakdown, Trailer Bridge is able to keep pace with the other carriers. If Trailer Bridge were configured with more vessels in the simulation similar to Crowley, they would match throughput and inventory levels. Scenario six shows a much higher spike in the total system inventory level, due to poor customer availability, and resolves the surge 82 days after the simulation starts.

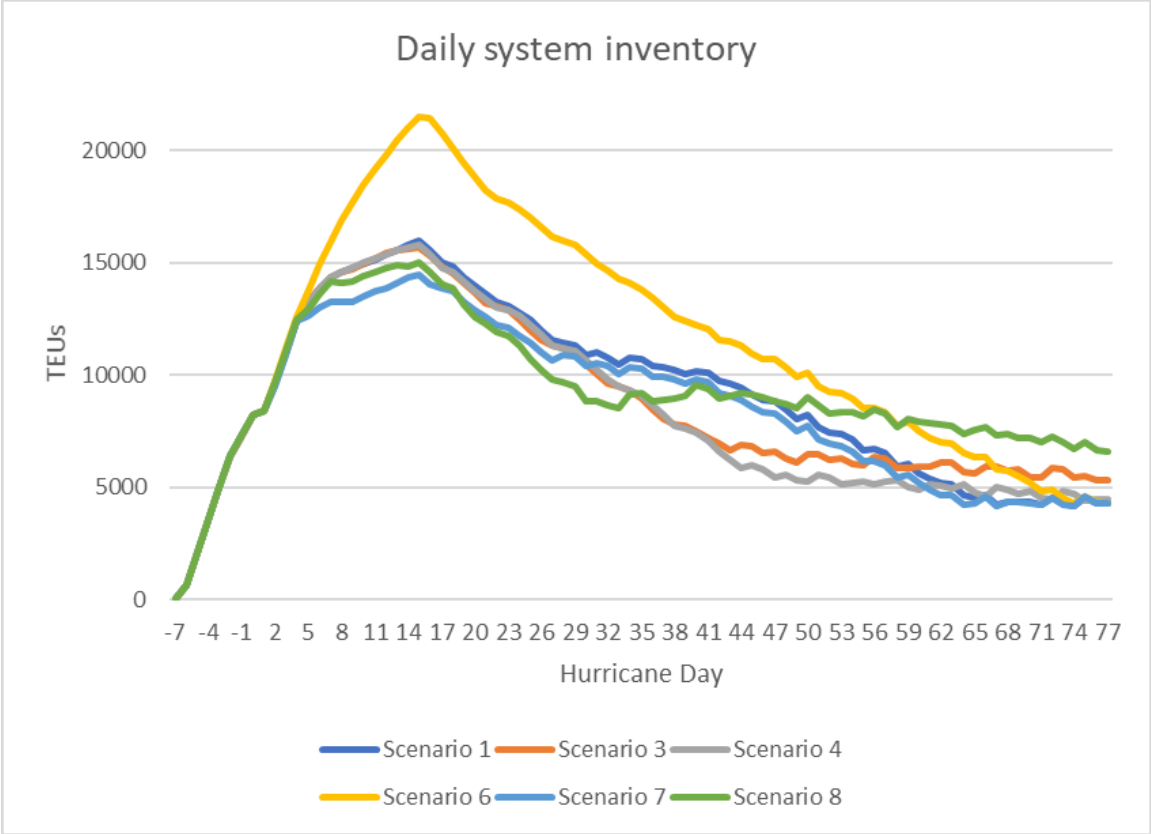


Figure 7. Daily System Inventory

Scenario eight lingers around 8000 for about 20 days and then starts declining toward a system steady state. However, a closer look at scenario eight shows that the surge could be resolved and the inventory returned to a normal steady state after 40 days if it were not for the inventory levels at Ponce. Figure 8 shows scenario eight by itself, with all TEU types represented within that scenario by carrier. Inventory levels at Ponce drive the second curve in scenario eight's total system inventory levels. The TEU processing times at Ponce were configured similar to Trailer Bridge, since Trailer Bridge is the smallest of the three carriers featured in this research and best representative of a carrier company that would operate out of Ponce. However, the real-world processing times in Ponce are completely relative because there are no data estimates to work with.

Ponce is a big beautiful port with close to no business at this time. As discussed previously, it was designed as an economic expansion to the island but has yet to take off. Thus, any deductions from scenario eight are truly relative to a carrier's ability to run operations out of Ponce. Pros and cons of operating HA reception out of Ponce will be discussed further in chapter five.

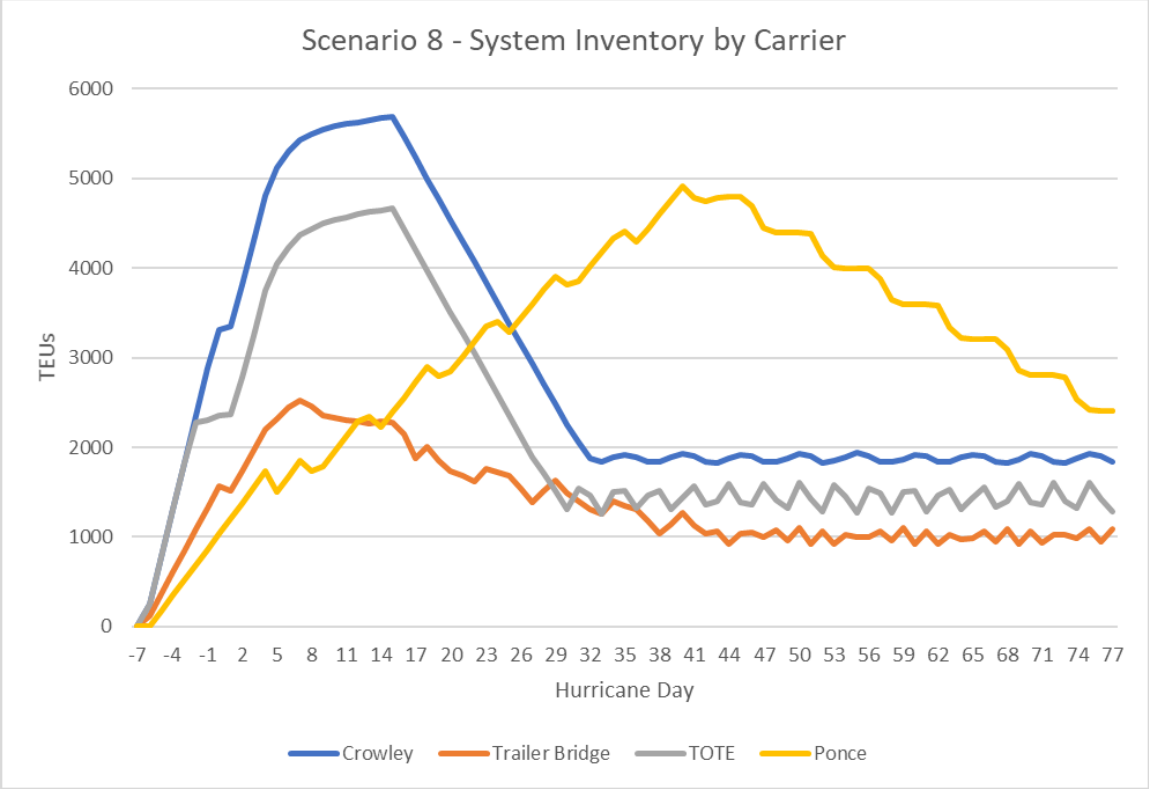


Figure 8. System Inventory by Carrier during Scenario 8

V. Conclusions

Chapter V further addresses how carrier design, alternative port, and customer availability findings impacted the Hurricane Maria response. Conclusive recommendations based on the simulation results and empirical data are then applied to the governmental and the global humanitarian audiences. Future research and limitations from the study are then discussed.

Finding 1 – The 40/40/20 split

Scenario four was configured to distribute HA TEUs amongst the three major domestic carriers in a way that reflects the unit market share between them. The proportionate distribution allowed all three carriers to return to a normal baseline of inventory throughput levels sooner than other scenarios. The distribution did not overload any particular carrier and minimized queue times and sizes. The proportionate distribution idea is also valid for future carrier selection. The future distribution percentages of HA TEUs would generally mirror the evolved unit market share for the region as it changes over time. Using the 40/40/20 split method also leverages the benefits of using pre-existing carriers who are experts at serving the customer base in that region. Discretion in the distribution would be required in the event that one or more of the carriers experience a reduced capacity or reduced operational effectiveness due to the effects of a disaster. However, carriers already have the vessels, cranes, manning, training, and trucking networks established and operating. Using a carrier also means leveraging that carrier's resources and connections on site to get the job done, with no additional startup times and costs.

Finding 2 – Hypothetical Impact of Ponce

Figure 9. Picture of the Port in Ponce

The idea of using Ponce completely deconflicts the two surges of normal TEUs and HA TEUs. Results in the scenarios for Ponce were quantitatively compelling, however data estimates used to drive Ponce were derived from the other carriers. There are no expert industry estimates for Ponce since there is close to no activity there. It has an 8000 TEU capacity and is normally empty. The question in using Ponce becomes one of how fast the port can be brought online and at what cost? Longshoreman and

serviceable equipment have to be acquired to unload vessels. The two red gantry cranes shown in Figure 9 were offline, pending maintenance. This had been the case for some time when the data was collected. A carrier willing to berth at Ponce must be found. A trucking fleet willing to operate out of Ponce that can handle the mountain ranges that stretch across the center of the island must be organized. Simulation eight was designed under the assumption that operations out of Ponce could begin immediately after the hurricane similar to the other carriers in the port of San Juan. If there is a start-up time associated with opening Ponce post-disaster, then that start up time introduces a potential opportunity cost of lost time that could have been used to ship HA TEUs via the pre-existing domestic carriers. Furthermore, any start up times would increase the total times reported for scenario eight in the analysis. Regardless, Ponce is the primary alternative to San Juan. If a boat sunk in the entryway to San Juan or if a disaster caused sufficient damage to San Juan, nothing would get in or out. The lifeline to Puerto Rico would be cut. Thus, Ponce is a prime target for further research.

Finding 3 – Customer Availability

When comparing total system inventory levels over time, customer availability was shown to have a large impact. Carriers can process containers into the port at any rate, but are unable to process containers out if customers are unable to receive them. Thus, returning key business online immediately after a disaster has a high impact on freight delays. This applies to all TEUs as they will be caught in longer queues and fuller ports. Ports that are backed up with containers need more time to sort and load them onto trucks. A busy yard was one of the primary reasons why Crowley opened Bayamon. The

Crowley yard morphed into a satellite storage for customers unable to accept cargo and the HA TEUs had to be placed somewhere accessible for further processing to FEMA's staging areas. When ports are online, but businesses have been heavily affected by a disaster like Hurricane Maria, then restoring customer availability becomes a priority for unblocking the flow of containers.

Recommendations for the U.S. State and Federal Levels

Divide a surge of humanitarian aid among the available carriers appropriately. Doing so requires awareness of the unit market share breakdown and awareness of the potential effect of the disaster on the carriers that may reduce their effectiveness. Appropriate contracting processes and supportive culture are also required that will enable logistics planners the freedom to leverage all available transportation capacity in the system. Pre-negotiation in contracting needs to maintain a sufficient level of flexibility to optimize throughput.

Explore secondary ports and shipping locations. Logistics planners need increased awareness of infrastructure readiness, the cost of operations, and the comparative speed of operations for an alternative port versus using pre-existing carriers who already service the region. Acquiring this data will better enable logistics planners to leverage all options. Using an alternative port like Ponce can deconflict any normal TEUs from HA TEUs, however the results in this study are relative to an external carrier's ability to bring the port online and sustain a competitive operations tempo.

Encourage businesses to prepare and rehearse a post disaster recovery plan to normalize operations as fast as possible after a disaster. Customer availability was shown to have a

large impact on the TEU surge duration across the system. Getting businesses back online and ready to receive freight will help unblock masses of TEUs stuck at the port. This research shows that an investment in preparation for commercial entities has a direct impact on post-disaster distribution and the ultimate length of the response phase.

Recommendations for the Global Humanitarian Community

For the humanitarian response community, it is important to remember that when surging aid into an isolated region, the total available system capacity must be recognized. Additionally, aid shipments should be divided to reflect market realities. A knowledge of which carriers are available, the general unit market share breakdown, and post-disaster carrier effectiveness will assist in carrier selection. Throughput is enhanced when the total system capacity is leveraged and customer availability to receive shipments is quickly restored.

Future Research

The feasibility of Ponce as an alternative shipping location requires additional research. Interviews should be conducted with local industry representatives to understand all facets of operations in the area. The time and cost required to bring the port online should be analyzed and compared to the time and cost of using pre-existing commercial carriers in the region. Recruited vessels and carriers will need to be compatible with Ponce's infrastructure and resource conditions.

The distribution of HA TEUs on land after initial delivery from the sea-ports is another area of future research. The scope of all the research conducted in this thesis, only covers the first black arrow in Figure 10. That includes all TEUs sent from FEMA to

the Federal Staging Areas. TEUs arrive at the Federal Staging Areas (FSA) after being trucked out of the port. Once TEUs arrive at the FSAs, aid is unloaded from the TEUs, organized, prioritized, and reloaded into different trucks for onward movement. After the FSAs there are Regional Staging Areas (RSA) where ownership of the aid is handed off from the federal to the state level. After the RSAs, aid is prioritized again and redistributed to the Points of Delivery (POD) where the aid is delivered to the disaster victims. A large network of land distribution could be modeled into the current simulation, however sufficient data could not be obtained.

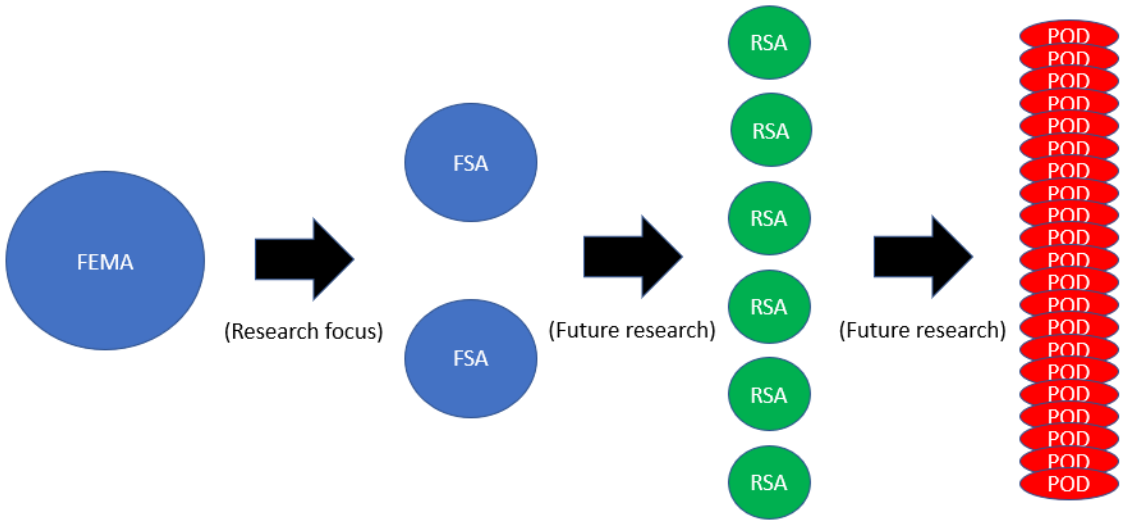


Figure 10. Example Federal Aid Distribution Chain

Limitations

The simulation was built on estimates from interviewees. No hard data was acquired that specified exactly when each container arrived and how much. Interviews were held with CEOs, vice presidents, commanders, port authority directors, and FEMA

logisticians. Their estimates informed the model. However, the researcher was unable to acquire exact data which would have added an element of preciseness to the model.

As mentioned in the future research, the trucking network was not modeled after the Federal Staging Areas (FSA). This was due to the lack of unified representation for the trucking industry in Puerto Rico. The trucking industry is very divided and independently owned. There was no union or collective representative that was available during the interview timeframe to provide additional data. The trucking network on Puerto Rico in itself is complex and essential to the delivery of aid. There are potentially many more untapped lessons learned if the trucking network were researched further.

Appendix A – Data Collection Agenda

AGENDA

Purpose: *To discuss/review a simulation of humanitarian aid and cargo movement process*
Dates: Monday, December 3, 2018 through Friday, December 7, 2018
Location: Isla Verde Meeting Room / Situation Meeting Room, CAD
Attendees: Capt. Nicholas Green (USAF), Jose Rivera-Solis (FEMA), Andres Ramos (FEMA), Omarig Rodriguez (FEMA), Derek Abbott (FEMA), Russ Garside (FEMA), Scott Erickson (FEMA), Dan Paton (FEMA), Kevin Colton (FEMA) Jose Riollano (Port Authority), Julian Bayne (Port Authority), Ian Carlo Cerna (Port Authority), Wally Gonzalez (Crowley), Eduardo Pagan (VP / General Manager TOTE), Jeff Vaughn & Mitch Luciano (Trailer Bridge), COL. Argizoni (PR National Guard & PR Air National Guard)

Agenda Items

Monday
December 3, 2018

11:00 AM – 1:00 PM
Isla Verde Meeting Room

- Jose Riollano from Port Authority (Airports)
- Julian Bayne from Port Authority (Ports)
- Joe Vazquez from Port Auhtority (Maritime)
- Ian Carlo Cerna from Port Authority (Ponce)
- Capt. Nicholas Green (USAF)
- Jose Rivera-Solis & Andres Ramos (FEMA)

Tuesday
December 4, 2018

9:00 AM – 11:00 AM
Isla Verde Meeting Room

- Wally Gonzalez from CROWLEY
- Jose Rivera-Solis & Andres Ramos (FEMA)
- Capt. Nicholas Green (USAF)

11:00 AM

- CROWLEY Site Visit after meeting

1

Wednesday **December 5, 2018**	**9:00 AM – 11:00 AM** **Isla Verde Meeting Room** • Eduardo Pagan from TOTE • Capt. Nicholas Green (USAF) • Jose Rivera-Solis & Andres Ramos (FEMA)
Thursday **December 6, 2018**	**9:30 AM – 11:30 AM** **Situation Room** • Jeff Vaughn & Mitch Luciano from TRAILER BRIDGE • Capt. Nicholas Green (USAF) • Jose Rivera-Solis & Andres Ramos (FEMA)
Friday **December 7, 2018**	**9:00 AM – 11:00 AM** **Isla Verde Meeting Room** • COL. Argizoni from PR NATIONAL GUARD / PR AIR NATIONAL GUARD • Capt. Nicholas Green (USAF) • Jose Rivera-Solis & Andres Ramos (FEMA) **1:00 PM – 3:00 PM** **Isla Verde Meeting Room** • FEMA Logistics Staff: Jose Rivera-Solis, Andres Ramos, Omarig Rodriguez, Dan Paton, Kevin Colton, Derek Abbott, Russ Garside, Scott Erickson • Capt. Nicholas Green (USAF)

Appendix B – Simulation Logic

The port of Jacksonville, Florida (JAX) was contacted by phone and email to request a specific query from their shipping database. They were unable to fulfill the request and referred the researcher to an outside company for data reporting called IHS Markit. IHS Markit provided a price quote for nine months of cargo data, from June of 2017 to February of 2018, covering exports to Puerto Rico and imports from Puerto Rico to the port of JAX with shipment vessel names, metric tons, and shipping container twenty-foot equivalent units (TEUs). Unfortunately, the price point was well beyond the available funding for this research, so average figures for the simulation data input were obtained based on the responses of the interviewees instead. The inability to obtain the raw data is noted as a limitation of this study for preciseness in the simulation model.

The FEMA Puerto Rico Logistics team scheduled meetings with available contacts during the week of 3-Dec-2017 to 7-Dec-2017. Contacts who were unavailable for meetings were not able to provide input on the simulation model. For those who were available for meetings, a three foot by four foot print out of the simulation model was prepared in advance and presented during the meetings to guide discussions for model corrections and to gather available data for input to the model. The simulation model will be discussed at length later in this chapter. The researcher flew out from Ohio to Puerto Rico to meet with the FEMA Puerto Rico team and to lead meetings with each of the scheduled parties. The meetings were held in a conference room within the FEMA operating facility in the city of Guaynabo each day. Organizations were scheduled to meet at different times and days. Each group had their own block of time, no overlap with other interviewees, and no one else to compete with during discussions. All interviews

were conducted in person and with two FEMA Puerto Rico Logistics team members: Jose-Rivera Solis and Derek “Doc” Abbott**.** The FEMA employees took their own personal notes, welcomed each group of interviewees, and added their own questions during the interviews. The loose structure of the meetings created a relaxing atmosphere where the interviewees were able to share as much or as little as they wanted. The FEMA team was already acquainted with most of the interviewees due to the working relationship FEMA has with the stakeholders already on the island of Puerto Rico. Notes were taken of each interview by the researcher and both FEMA representatives previously mentioned. Contact information was acquired for each interviewee for follow up questions. The visit to Puerto Rico included a tour of the port of San Juan and the Crowley shipping yards, to validate the simulation model and clarify remaining questions in the process. Notes were assimilated each night after the meetings and categorized into a table to compare values.

Creation nodes are depicted as irregular pentagons in ARENA. After creation, HA entities then enter a decision node, depicted as a diamond, that is set to route a specified percentage of the HA to the four delivery routes constructed in the model. The four delivery routes are via TOTE, Trailer Bridge, Crowley, or by an external carrier through the port of Ponce. The decision node for carrier selection is used as a throttle that is adjusted differently for the individual simulation scenarios.

To model the change in normal freight demand, two more creation nodes were added to each carrier. One called “normal surge” to inject additional normal freight into each carrier’s portion of the simulation that simulates the 45% total freight increase, which starts at the same time as the HA cargo and shuts off after 3 weeks. The next

creation node added was called “normal recovery” which likewise injects additional normal freight to simulate the 20% total freight increase into each carrier and acts like normal surge but begins when normal surge ends. “Normal” in this context simply refers to a TEU that is not HA cargo; in other words, it is destined for one of the regular customers that the respective carrier deals with regularly.

The base model allocates 100% of the HA TEUs to Crowley. Given FEMA’s strategy to surge HA cargo during a disaster to avert true humanitarian catastrophes (Goentzel et al., 2017), the interarrival rate for the HA TEUs within the simulation were given an exponential distribution. The containers are then processed using a standardized port processing time (PPT) derived from interview responses that is sufficient to maintain a steady state of cargo throughput from the recovery phase indefinitely. PPTs were reported to allow a barge to be downloaded within 4 hours. Since there is no data available regarding the internal processes of the carriers, a PPT of 0.012308 hours with one simulation resource was designed and generalized across the ports. The generalized PPT is calculated by dividing the 4 hours required to download a vessel by the 325 TEUs on the vessel. The resulting number provides how long it takes to process each container. These numbers are based on responses from Trailer Bridge, who was willing to share specifically how long it takes for them to offload vessels. After completing the JAX PPT, entities progress to a following queue for batching onto a barge or ship. The number of containers that can be carried on each of the vessels, the number of vessels available, and the speed of the vessels is relative to each carrier as reported in the interviews.

After the entities are batched for shipment, they either continue from the first diamond in the model from left to right to the upper track with the pre-hurricane normal

number of vessels available for processing and transit times or get rerouted to a different processing node on the lower track that has the increased number of vessels available. The increased number of vessels allows for more batches of TEUs to be processed simultaneously. The entities are rerouted to the increased fleet size based on a conditional event where a variable within the system is changed from zero to one. A switch basically, flips at a specified time and reroutes all entities to the increased fleet size processing nodes with their added vessel resources available for processing more batches of entities. In either transit process through normal fleet sizes or increased fleet sizes, the duration of travel time is relative to the type of vessel used.

Once entities complete their travel time through the western Atlantic Ocean from JAX to the port of San Juan in Puerto Rico, there is a second conditional event where all cargo is rerouted to a holding node when the hurricane is triggered within the simulation. A switch is flipped that lasts for 48 hours on 20 Sep-2017 of the simulation to represent the passing of Hurricane Maria over the island. During this time all container traffic aboard ships and on delivery trucks is halted temporarily. The seaports open after the 48 hours pass, since the carriers all commented that they were relatively unaffected at the ports and were able to resume operations within hours of the hurricane clearing.

Entities are unbatched or offloaded from vessels upon arrival in Puerto Rico and are processed onto trucks for delivery. The rate of processing for the Puerto Rican side for vessel offload and truck onload, mirrors that of the JAX side for truck offload and vessel onload as previously mentioned to maintain the steady state across the simulation. Once TEUs are in-processed at the port, there is another conditional event that activates after the hurricane begins regarding customer availability. All of the interviewees

commented on the degraded ability of customers to receive their cargo after the hurricane. As mentioned in Chapters 1 and 2 of this research, the reduced customer availability was the result of several factors. Power outages translated into an inability for stores to maintain refrigerated cargo. Fuel shortages reduced the number of deliveries that could be completed and created the risk of drivers getting stranded without a refuel. Warehouses were damaged leaving inventory vulnerable to security threats. Given the accumulation of factors working against business immediately after the hurricane to receive their ordered cargo, inventory levels at the ports began to swell. The ports were being used as a temporary satellite storage facility by the consignees or customers until they were back online and ready to receive their shipments. To model this, a conditional event was created that filters a percentage of cargo out of the delivery stream and penalizes it with a 24-hour delay. The penalized cargo is then returned to the stream and re-enters the same filter for a chance of consecutive penalties or being allowed to pass through to the delivery trucks for onward movement to the destination. A specific percentage of available businesses after the hurricane passes as a data point was not found. Instead, the model was tuned until inventory levels in the port swelled to at least 2000-3000 containers awaiting transport, which was indicated as a salient characteristic of the historical event from interview responses. It was found that filtering and penalizing 60% of the cargo for two weeks yielded the inventory swell in the port that was described by interviewees. In other words, 40% of the containers were able to pass through to the customers, and 60% were retained at the port to simulate the bulk of customers who were unable to receive their cargo immediately after the disaster. After two weeks all cargo is released to the trucks to await available resources for transportation. The percentage of

TEUs filtered and penalized is also used as a throttle that can be adjusted for testing purposes in the model.

Once TEU entities clear the customer availability event, they are then processed onto trucks for delivery. Another significant delay reported in the interviews referenced the temporary road closures that resulted from the hurricane's wake. Trees, powerlines, and mudslides in particular, disrupted or completely obstructed many parts of the island's roadways. During one interview, a Puerto Rican Guard member commented on how it took him 4 days to report in to work after the hurricane, simply because he was chain sawing trees or shoveling mudslides that obstructed the roadways between his home and his location of employment (Green, 2018). Discussions with the Puerto Rican Guard unit representative and FEMA employees during the meetings concluded that main roadways were cleared about 24-48 hours after the hurricane passed. 48 hours after the hurricane passes through the system, all entities are released from this holding cell to continue onward movement to trucks.

A one-hour delivery time was used across all carriers for truck delivery. Business delivery distances were approximately 20 minutes from the port of San Juan. This estimate was derived from a 20 minutes approximate delivery distance, plus drop off time of 20 minutes with the customer, and the return trip of another 20 minutes. The trucking industry was found during this case study to be lacking any sort of formal representation or unified organization. Trucking networks in Puerto Rico are based on a "I know a guy" network that is relative to each business who has established relationships with their regular business partners. The delivery process node is simply a one-hour delay for TEUs that pass through, which increases the total time an entity is in the system. Once an entity

passes through the delivery node, it has completed its journey through the entire system and is disposed on the far-right side of the model.

Crowley coordinated and opened an alternate holding area for HA cargo in a stadium in the city of Bayamon. The Bayamon stadium received all containers directly from the Crowley yard as they came off vessels in the port of San Juan. Since the HA cargo traversing the Crowley yard was competing with normal cargo for resources such as stacker cranes, HA TEU entities were given a priority within the model so that they are always processed first before normal cargo when the system has the option between the two within a queue. Bayamon was opened shortly after the hurricane passed, and thus a modification to the standard Crowley TEU routing model was added. A series of decision nodes are presented to the entities that ask whether or not Bayamon is open. If Bayamon is open, then another question is asked whether the entity passing through is a normal TEU. If it is a normal TEU then it continues on the upper normal track for truck processing to customers. If the TEU is not normal, or in other words HA cargo, then the TEU is routed to the lower track where the HA containers are processed for onward movement to Bayamon with priority over normal containers. A transit time delay to Bayamon of 30 minutes is added similar in similar fashion to the transit delays added for normal cargo to their destinations. The 30 minutes was determined based on the actual drive time distances quoted in the interviews.

As entities pass through the assignment nodes within the simulation, incremental changes occur in the variables. For example, when a normal TOTE TEU enters the system into TOTE's cargo flow, the TEU entity immediately passes through a node called "Increase TOTE inventory" that increases the variable "TOTE inventory" by one.

As that same entity is shipped and then offloaded from its vessel in the simulated Puerto Rico section, the entity passes through another node called “TOTE increase deliverable TEU count” that increases the “TOTE deliverable” variable by one. The deliverable variables represent the total number of deliverable containers on island in Puerto Rico by carrier. As the container entity is loaded, trucked, and exits the simulation there is one last change in the variables that decreases the TOTE inventory and TOTE deliverable variables each by one. Crowley refers to the carrier, TB refers to the carrier Trailer Bridge, Ponce refers to an alternate routing for HA entities through the south port of Ponce by an external carrier, JAX refers to the total inventory across all carriers at the port of JAX, and Bayamon refers to the HA entities that pass through the simulated Bayamon yard that branches as an extension from Crowley’s terminal.

The system switches are binary and used to activate and deactivate certain features within the model. Switches are used to open Bayamon for Crowley, increase fleet sizes after the hurricane, and delay entities in vessels on the water, awaiting customer availability, and for road closures. They are activated by creating entities at a specified simulation date, similar to other creation nodes previously mentioned, using an expression. An example of the entity creation time expression to start the hurricane would be: “CalDateToBaseTime(2017,9,20)”, where one entity is created at a start date of 20-Sep-2017 within the simulation’s calendar.

A second set of variables in the model capture the number of containers in queue at a given time in each of the four main queues of each carrier’s respective entity flow. Four queues for each of the four carriers and Ponce total to 16. The major queues for each carrier include: the number of containers waiting in the queue for processing into batches

in JAX, number in queue for loading onto vessels, number in queue for unloading from vessels, and the number in queue for loading onto trucks.

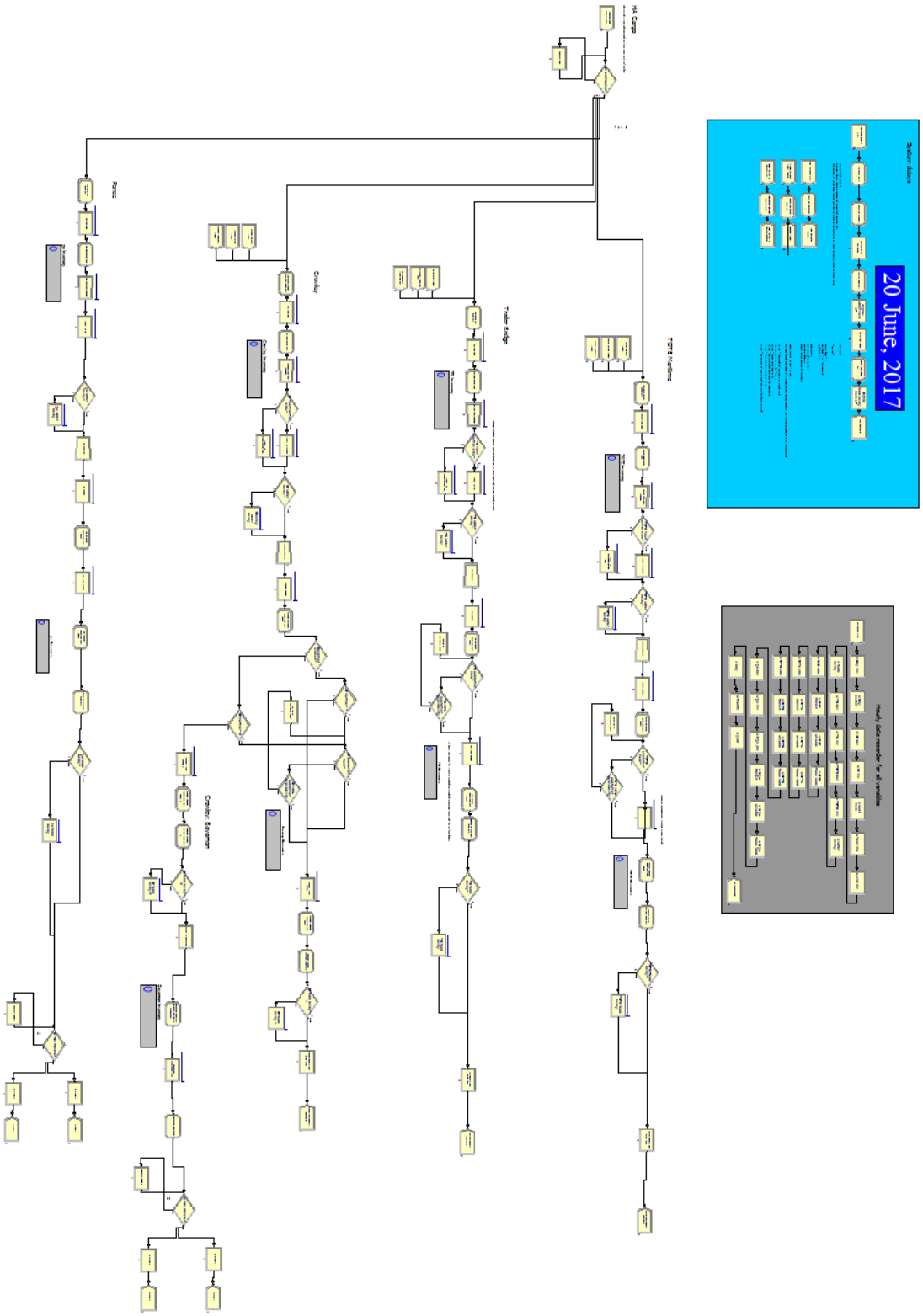
As the variables fluctuate within the simulation, a system of recorders was designed to read the pulse of the model using the variables for model validation. The recorders were activated by an entity that would pass through each node. As the entity passes through, the node is triggered to record the current value of the given variable at the time of the entities passing. The values are recorded into an excel file which can then be reviewed after simulation completion. The entities created for recording variables were set to flow once per day so as to obtain a daily recording of all values.

As HA TEUs enter the route to Ponce they are subject to the same standardized PPT used for the other carriers to get through JAX, and then they are subject to a transportation fleet size and speed equivalent to that of Trailer Bridge. The fleet sizing and operations of Trailer Bridge seemed comparable to what would likely be used out of Ponce. After arriving in Puerto Rico via Ponce the TEUs again pass through an equivalent PPT and truck loading times. One notable feature that is removed from the Ponce flow is that of customer availability. Since HA is not concerned with a regular business customer, it is not penalized like normal cargo that has to wait for businesses to re-open. Instead, HA is trucked directly to Federal Staging Areas (FSA) where federal employees re-establish accountability of the goods and coordinate transfer of HA supplies to the state government. The entities in the Ponce flow are subject to the same delays as the carriers while traveling across the water and roads.

Using the read write function in ARENA daily queue lengths were recorded for each of the four major processing points in the model: port processing at JAX, batched

processing onto vessels for transit, unbatched processing off of vessels into San Juan, and final container processing onto trucks for delivery. These four processing points in the timeline are multiplied by the four routes a container may take to reach Puerto Rico, which is via Crowley, TOTE Maritime, Trailer Bridge, or via a fourth external shipper using the port of Ponce. The number of containers or entities in queue for each of the 16 queues were recorded daily and exported to an excel sheet. Those queue lengths for the duration of the 12-week simulation were then averaged across the 25 replications of each simulation. The resulting 25 replication averages over 12 weeks were plotted in multiple ways and used for the initial analysis.

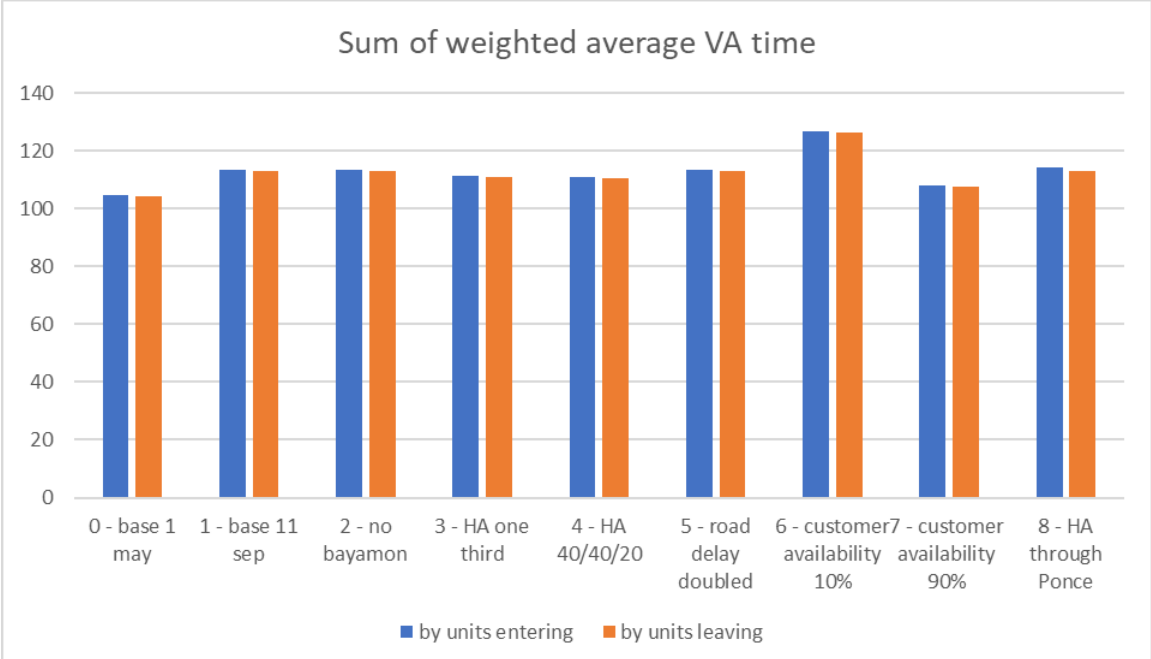
Screenshot of the full ARENA model

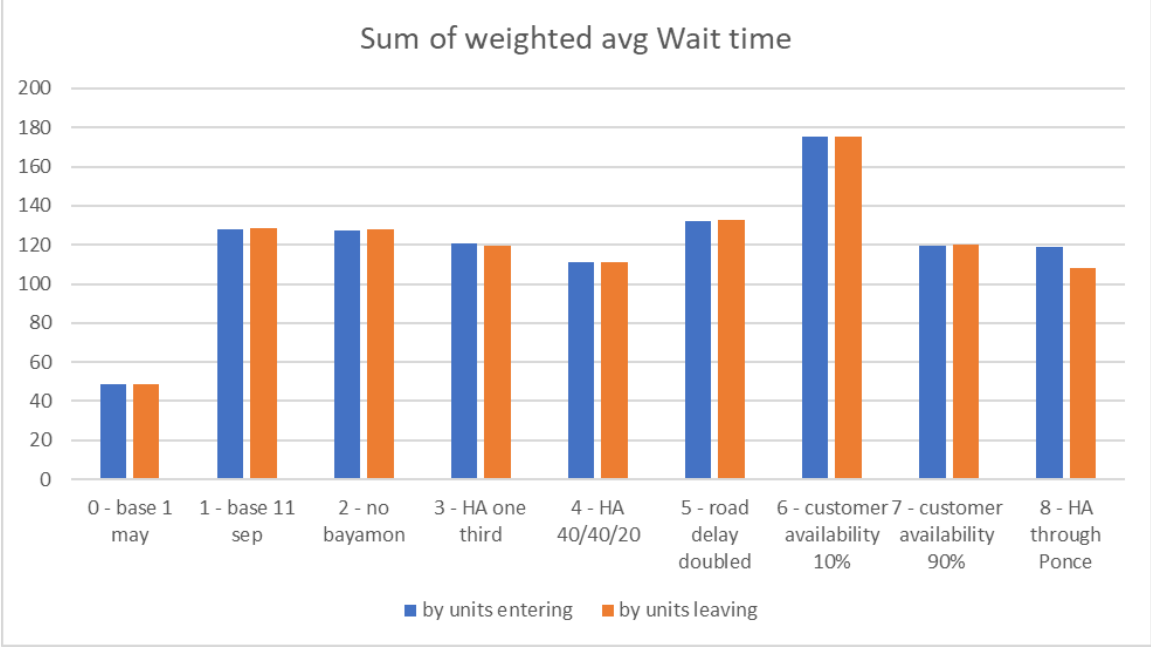


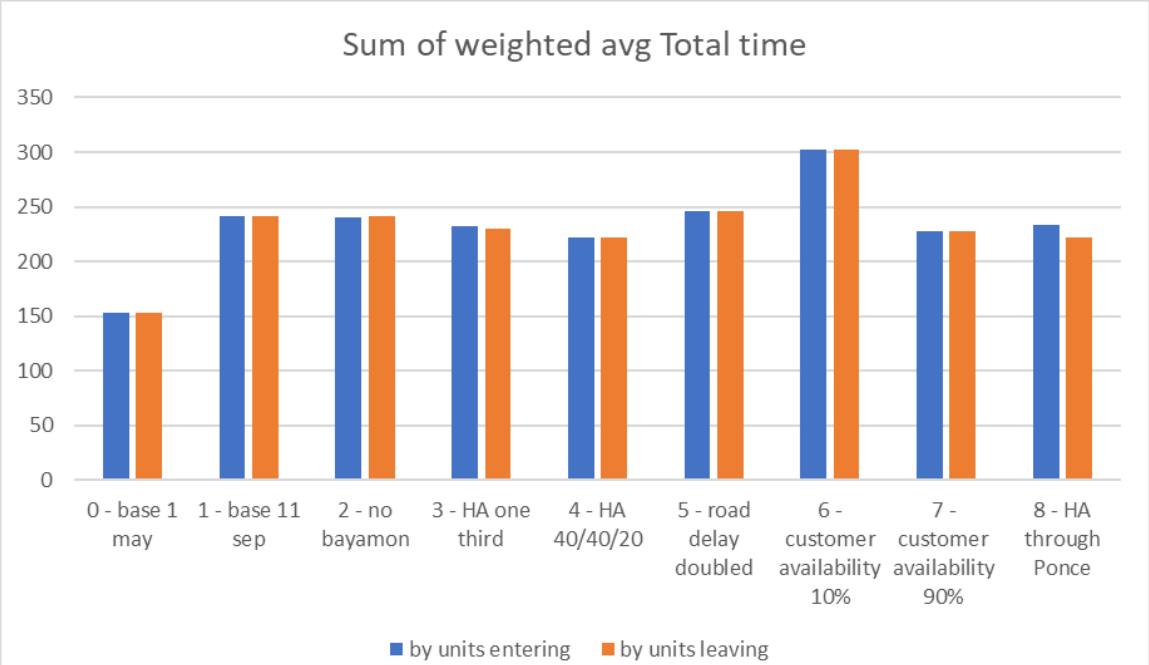
Appendix C – ARENA Output

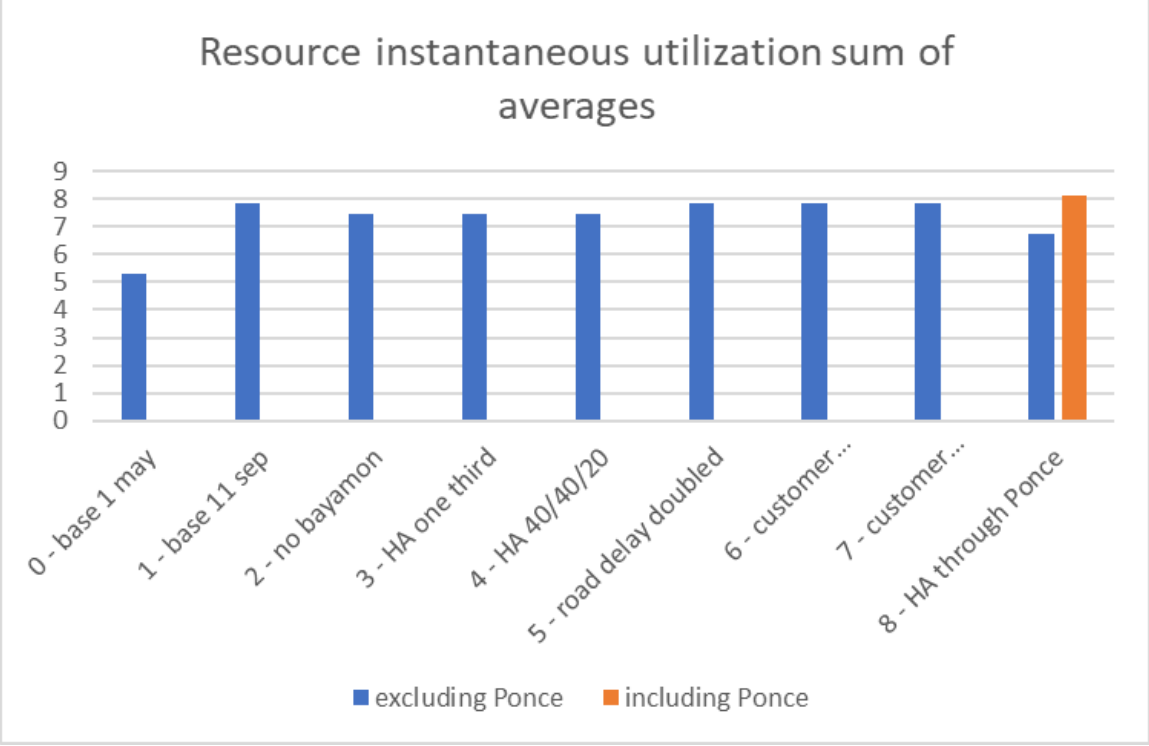
Averages across the 25 replications are used. For example, a data point for a given day is the average of that data point on that day across the 25 replications.

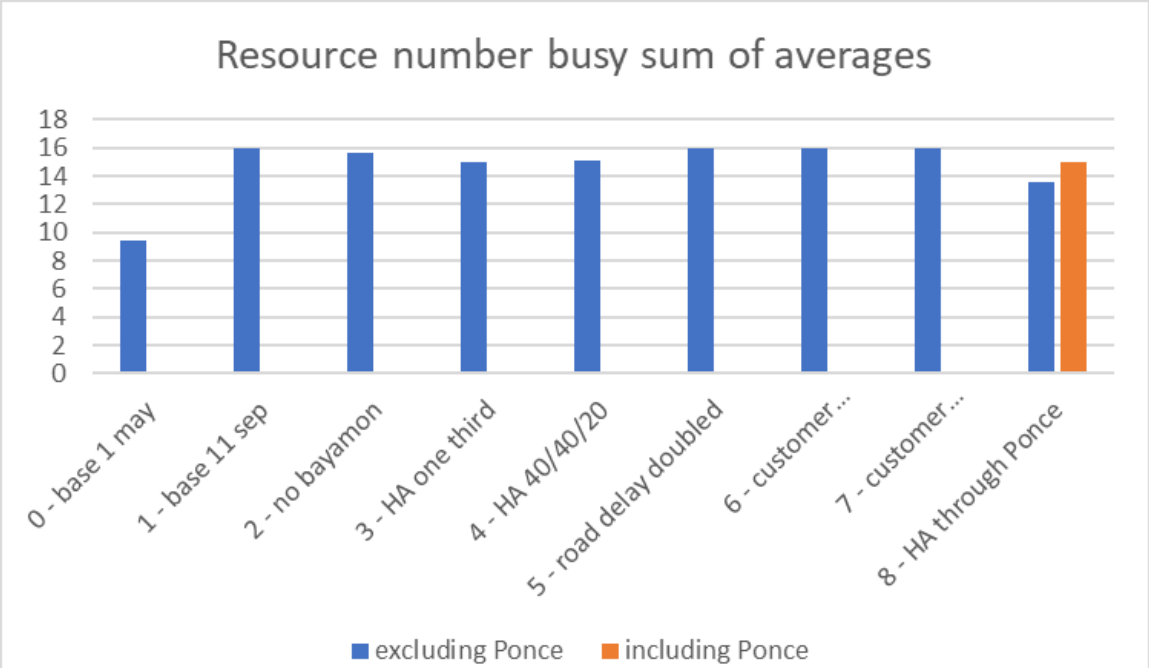
	0 - base 1 may	1 - base 11 sep	2 - no bayamon	3 - HA one third	4 - HA 40/40/20	5 - road delay doubled	6 - customer availability 10%	7 - customer availability 90%	8 - HA through Ponce
System Number Out	46640.16	76259.32	76261.32	75216.24	76054.72	76258.92	76258.36	76260.04	73919.68
Sum of weighted avg VA time									
by units entering	104.6543	113.442	113.3151	111.5444	110.9228	113.3765	126.7899	107.8709	114.055
by units leaving	104.2268	113.1669	113.0366	110.7488	110.6672	113.102	126.4374	107.6284	113.1325
Sum of weighted avg Wait time									
by units entering	48.70497	127.945	127.5569	120.8028	110.9127	132.1707	175.4955	119.6115	119.1905
by units leaving	48.81755	128.2289	128.028	119.5831	111.0187	132.5065	175.5228	119.9935	108.3514
Sum of weighted avg Total time									
by units entering	153.3593	241.387	240.872	232.3472	221.8355	245.5472	302.2855	227.4824	233.2455
by units leaving	153.0444	241.3958	241.0646	230.3319	221.686	245.6085	301.9602	227.622	221.4839
Sum of avg entities									
entering system	50425	80489	80489	80489	80489	80489	80489	80489	80489
leaving system	46555.16	76174.32	76176.32	75131.24	75969.72	76173.92	76173.36	76175.04	73834.68
in work	3686.17	9280.597	9268.155	8880.375	8524.435	9439.744	11568.87	8760.198	9484.651
Sum of weighted average times in queue	29.65544	52.56763	52.74459	29.6271	30.18722	54.29416	70.43545	55.47805	27.91225
Sum of avg number in queue	1115.19	4571.595	4564.266	3137.939	3374.052	4734.562	6361.526	4261.783	2363.111
Resource instantaneous utilization sum of averages									
excluding Ponce	5.275415	7.818928	7.430721	7.428722	7.473018	7.816312	7.819255	7.817214	6.719297
including Ponce									8.117624
Resource number busy sum of averages									
excluding Ponce	9.361345	15.98637	15.59517	15.00147	15.11578	15.98386	15.98528	15.98395	13.5951
including Ponce									14.99343
Resource scheduled usage utilization sum of averages									
excluding Ponce	5.275415	7.818928	7.430721	7.428722	7.473018	7.816312	7.819255	7.817214	6.719297
including Ponce									8.117624
Resource total seized sum of averages									
excluding Ponce	143704	240249.1	233008.4	230980.4	232730.6	240247.4	240259.3	240249.8	209123.2
including Ponce									228339.2

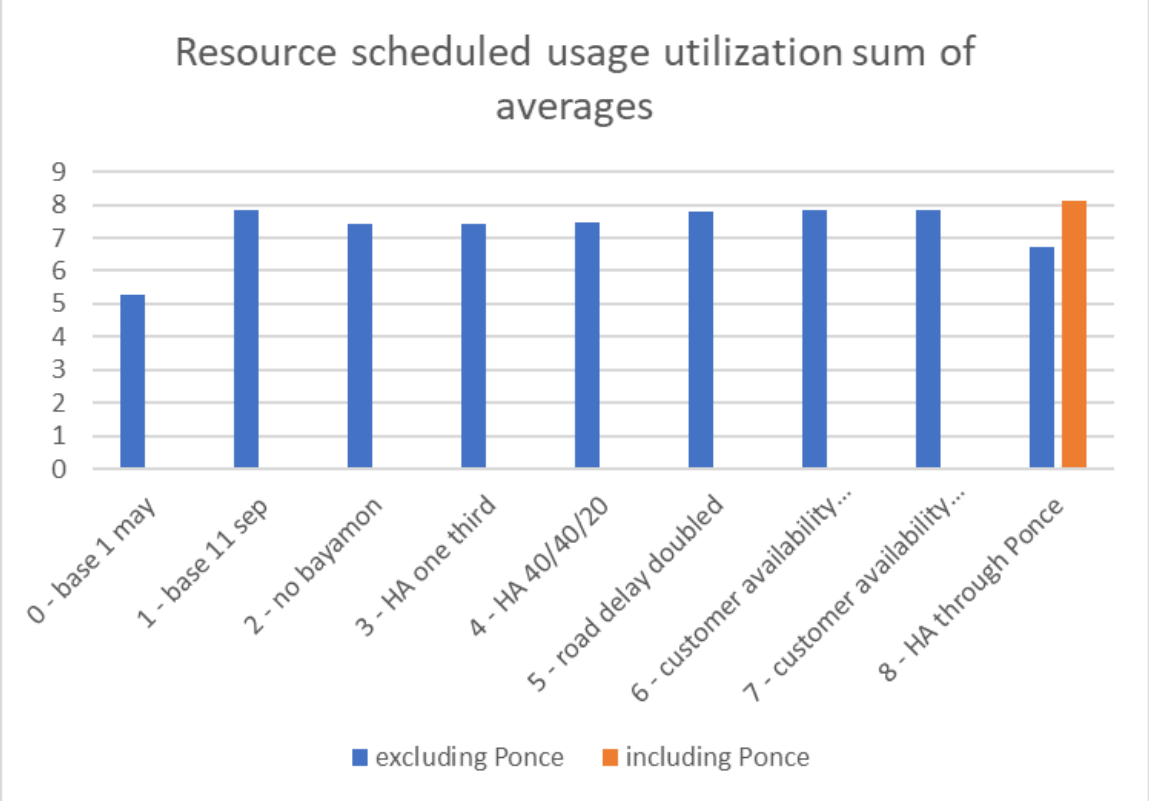

Sum of weighted average VA time
140
120
100
80
60
40
20
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability 10%
7 - customer availability 90%
8 - HA through Ponce
by units entering
by units leaving

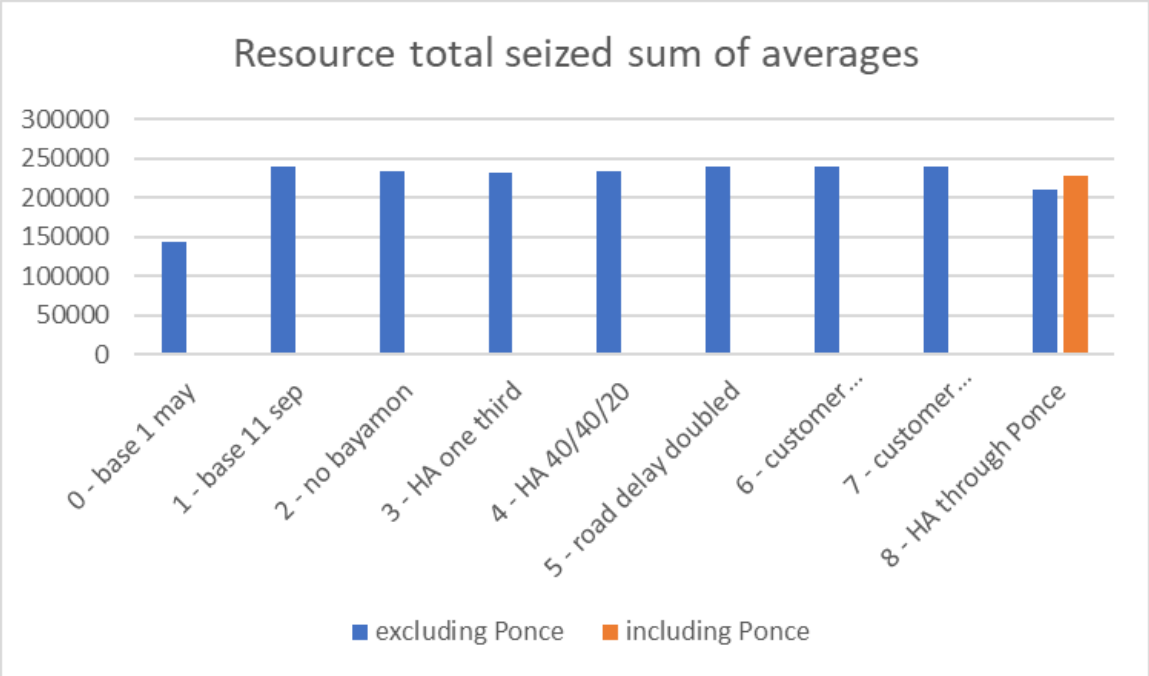

Sum of weighted avg Wait time
200
180
160
140
120
100
80
60
40
20
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability 10%
7 - customer availability 90%
8 - HA through Ponce
by units entering
by units leaving

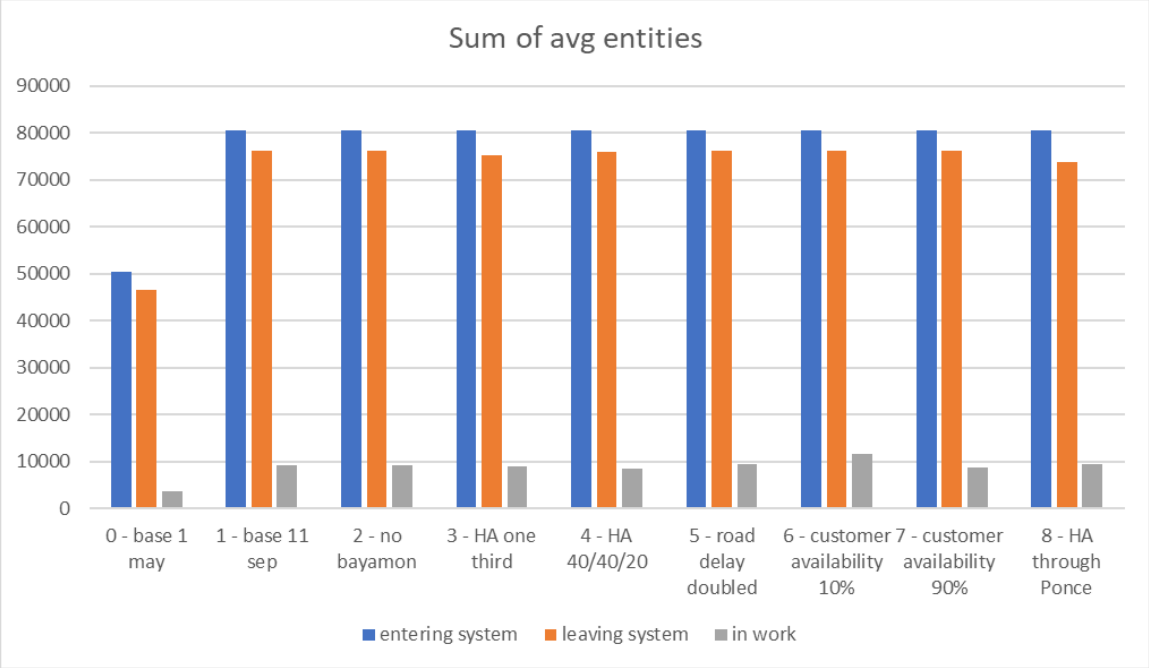

Sum of weighted avg Total time
350
300
250
200
150
100
50
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability 10%
7 - customer availability 90%
8 - HA through Ponce
by units entering
by units leaving

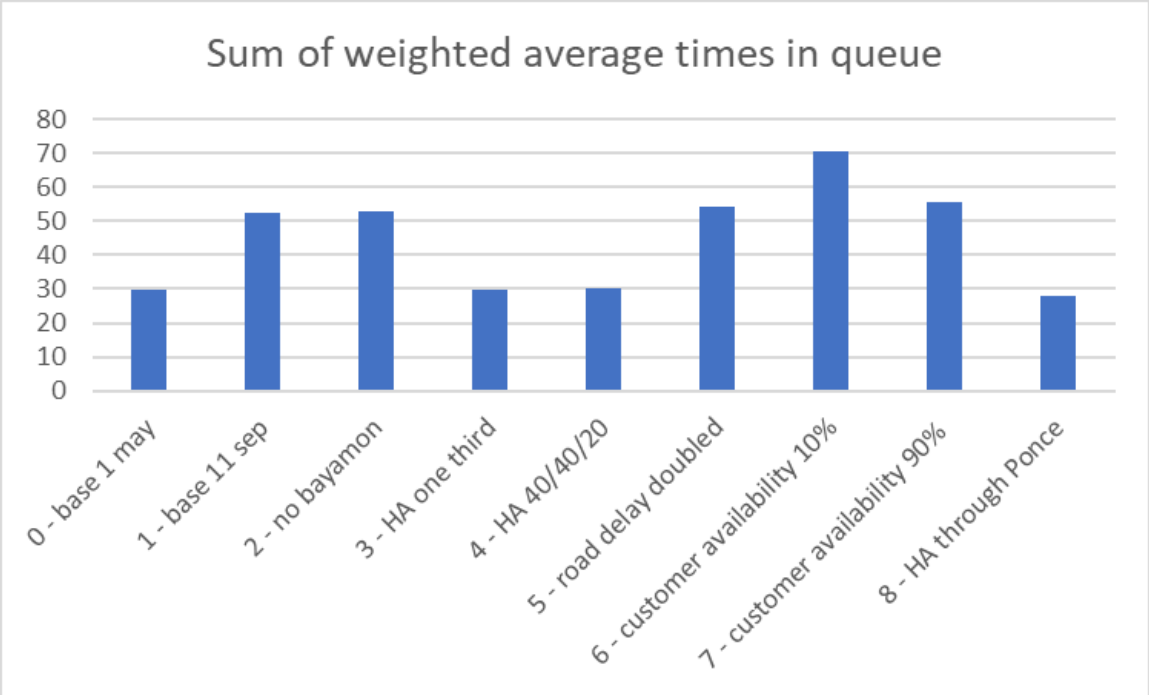

Resource instantaneous utilization sum of averages
9
8
7
6
5
4
3
2
1
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer ...
7 - customer ...
8 - HA through Ponce
excluding Ponce
including Ponce

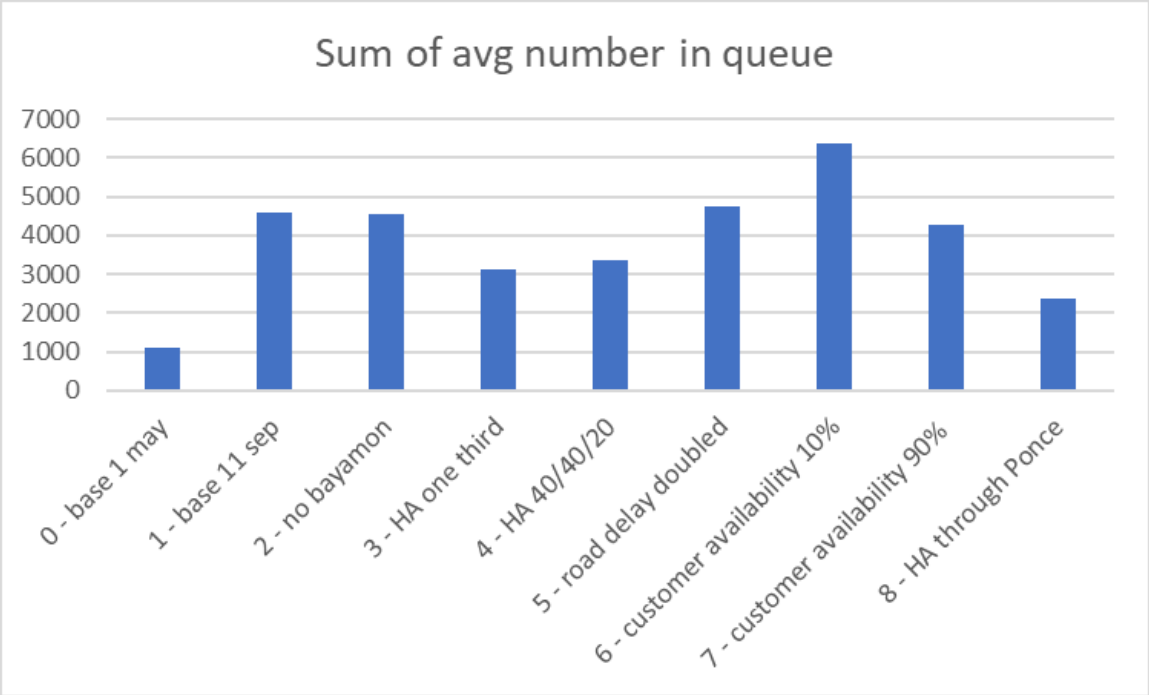

Resource number busy sum of averages
18
16
14
12
10
8
6
4
2
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer ...
7 - customer ...
8 - HA through Ponce
excluding Ponce
including Ponce


Resource scheduled usage utilization sum of averages
9
8
7
6
5
4
3
2
1
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability...
7 - customer availability...
8 - HA through Ponce
excluding Ponce
including Ponce


Resource total seized sum of averages
300000
250000
200000
150000
100000
50000
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer...
7 - customer...
8 - HA through Ponce
excluding Ponce
including Ponce


Sum of avg entities
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability 10%
7 - customer availability 90%
8 - HA through Ponce
entering system
leaving system
in work


Sum of weighted average times in queue
80
70
60
50
40
30
20
10
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability 10%
7 - customer availability 90%
8 - HA through Ponce


Sum of avg number in queue
7000
6000
5000
4000
3000
2000
1000
0
0 - base 1 may
1 - base 11 sep
2 - no bayamon
3 - HA one third
4 - HA 40/40/20
5 - road delay doubled
6 - customer availability 10%
7 - customer availability 90%
8 - HA through Ponce

Scenario zero

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	46,640

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	133.63	0.14	132.94	134.30	124.64	146.18
TB freight	132.96	0.21	131.80	133.91	125.51	143.31
TOTE freight	61.5260	0.23	59.9977	62.2614	52.3847	74.0452
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	27.1373	0.03	26.9820	27.2316	14.8110	37.0704
TB freight	54.9804	1.35	48.5282	61.1783	13.9821	112.15
TOTE freight	67.1349	0.07	66.8668	67.4851	39.7511	91.2098
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	160.76	0.14	160.12	161.44	141.20	180.99
TB freight	187.95	1.54	180.92	194.81	143.82	247.32
TOTE freight	128.66	0.24	126.99	129.43	95.0322	161.36
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

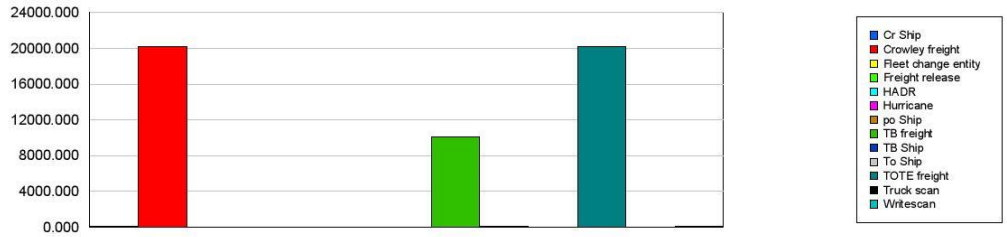
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	56.0000	0.00	56.0000	56.0000
Crowley freight	20170.00	0.00	20170.00	20170.00
Fleet change entity	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00
Hurricane	0.00	0.00	0.00	0.00
po Ship	0.00	0.00	0.00	0.00
TB freight	10085.00	0.00	10085.00	10085.00
TB Ship	31.0000	0.00	31.0000	31.0000
To Ship	22.0000	0.00	22.0000	22.0000
TOTE freight	20170.00	0.00	20170.00	20170.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	52.0000	0.00	52.0000	52.0000
Crowley freight	18555.16	22.89	18472.00	18697.00
Fleet change entity	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00
Hurricane	0.00	0.00	0.00	0.00
po Ship	0.00	0.00	0.00	0.00
TB freight	9100.00	0.00	9100.00	9100.00
TB Ship	28.0000	0.00	28.0000	28.0000
To Ship	21.0000	0.00	21.0000	21.0000
TOTE freight	18900.00	0.00	18900.00	18900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	3.5157	0.00	3.4980	3.5327	0.00	4.0000
Crowley freight	1544.04	1.30	1538.10	1550.16	0.00	1766.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
Hurricane	0.00	0.00	0.00	0.00	0.00	0.00
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	896.25	6.94	864.54	927.23	0.00	1240.00
TB Ship	2.1371	0.02	2.0394	2.2316	0.00	3.0000
To Ship	0.6431	0.00	0.6271	0.6507	0.00	1.0000
TOTE freight	1245.88	2.28	1230.20	1253.14	0.00	1579.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr JAX PPT.Queue	0.2092	0.00	0.2043	0.2150	0.00	1.3682
Crowley avg TEU shipped.Queue	17.7107	0.01	17.6713	17.7946	0.00	36.1790
Crowley truck loading.Queue	0.8117	0.03	0.6882	0.9760	0.00	5.8646
Crowley unload.Queue	8.3330	0.04	8.1677	8.4958	0.00	21.3088
TB avg TEU shipped.Queue	32.0951	0.01	32.0530	32.1586	0.00	64.7087
TB JAX PPT.Queue	0.0927	0.00	0.08945667	0.0959	0.00	0.9533
TB truck loading.Queue	0.9207	0.05	0.7317	1.1151	0.00	5.5904
TB unload.Queue	7.3116	0.06	7.0302	7.5412	0.00	18.0872
TOTE avg TEU shipped.Queue	44.7187	0.02	44.6491	44.7920	0.00	90.1173
TOTE JAX PPT.Queue	0.2090	0.00	0.2048	0.2176	0.00	1.3460
TOTE truck loading.Queue	1.3235	0.05	1.1388	1.5344	0.00	8.2746
TOTE unload.Queue	20.8834	0.07	20.5452	21.3133	0.00	48.2027
transit to Crowley.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	15.6343	1.44	9.0419	21.9733	0.00	52.2854
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Cr JAX PPT.Queue	2.0925	0.01	2.0436	2.1503	0.00	15.0000
Cr road delay 1.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	177.11	0.10	176.71	177.95	0.00	360.00
Crowley truck loading 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loading.Queue	7.4919	0.31	6.3231	9.0312	0.00	122.00
Crowley unload.Queue	77.5042	0.32	75.9706	79.0429	0.00	359.00
Crowley water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.40	0.05	160.19	160.72	0.00	325.00
TB JAX PPT.Queue	0.4635	0.00	0.4473	0.4793	0.00	5.0000
TB road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB truck loading.Queue	4.1558	0.20	3.3029	5.0335	0.00	103.00
TB unload.Queue	33.0038	0.26	31.7335	34.0401	0.00	324.00
TB water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TOTE avg TEU shipped.Queue	442.46	0.15	441.78	443.19	0.00	900.00
TOTE JAX PPT.Queue	2.0902	0.01	2.0488	2.1764	0.00	15.0000
TOTE road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TOTE truck loading.Queue	12.4080	0.45	10.6766	14.3852	0.00	167.00
TOTE unload.Queue	195.78	0.67	192.61	199.81	0.00	899.00
TOTE water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.2335	0.02	0.1354	0.3278	0.00	1.0000
transit to TB_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.4639	0.00	0.4526	0.4755	0.00	1.0000
Crowley ship	0.7031	0.00	0.6996	0.7065	0.00	0.8000
Crowley ship increased	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loader	0.4268	0.00	0.4197	0.4348	0.00	1.0000
Crowley unloader	0.4301	0.00	0.4229	0.4397	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.9518	0.00	0.9499	0.9521	0.00	1.0000
TB barge increased	0.00	0.00	0.00	0.00	0.00	0.00
TB loader	0.2321	0.00	0.2265	0.2384	0.00	1.0000
TB truck loader	0.2104	0.00	0.2054	0.2179	0.00	1.0000
TB unloader	0.2041	0.00	0.1994	0.2109	0.00	1.0000
TOTE loader	0.4626	0.00	0.4535	0.4758	0.00	1.0000
TOTE Ship	0.3215	0.00	0.3136	0.3253	0.00	0.5000
TOTE Ship increased	0.00	0.00	0.00	0.00	0.00	0.00
TOTE truck loader	0.4339	0.00	0.4283	0.4406	0.00	1.0000
TOTE unloader	0.4349	0.00	0.4300	0.4416	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.4639	0.00	0.4526	0.4755	0.00	1.0000
Crowley ship	3.5157	0.00	3.4980	3.5327	0.00	4.0000
Crowley ship increased	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loader	0.4268	0.00	0.4197	0.4348	0.00	1.0000
Crowley unloader	0.4301	0.00	0.4229	0.4397	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	1.9036	0.00	1.8999	1.9042	0.00	2.0000
TB barge increased	0.00	0.00	0.00	0.00	0.00	0.00
TB loader	0.2321	0.00	0.2265	0.2384	0.00	1.0000
TB truck loader	0.2104	0.00	0.2054	0.2179	0.00	1.0000
TB unloader	0.2041	0.00	0.1994	0.2109	0.00	1.0000
TOTE loader	0.4626	0.00	0.4535	0.4758	0.00	1.0000
TOTE Ship	0.6431	0.00	0.6271	0.6507	0.00	1.0000
TOTE Ship increased	0.00	0.00	0.00	0.00	0.00	0.00
TOTE truck loader	0.4339	0.00	0.4283	0.4406	0.00	1.0000
TOTE unloader	0.4349	0.00	0.4300	0.4416	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

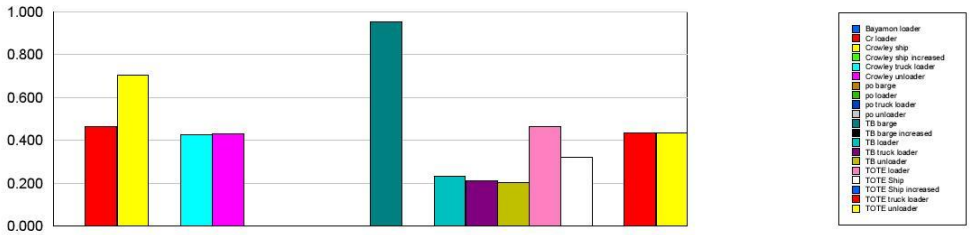
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	0.4639	0.00	0.4526	0.4755
Crowley ship	0.7031	0.00	0.6996	0.7065
Crowley ship increased	0.00	0.00	0.00	0.00
Crowley truck loader	0.4268	0.00	0.4197	0.4348
Crowley unloader	0.4301	0.00	0.4229	0.4397
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.9518	0.00	0.9499	0.9521
TB barge increased	0.00	0.00	0.00	0.00
TB loader	0.2321	0.00	0.2265	0.2384
TB truck loader	0.2104	0.00	0.2054	0.2179
TB unloader	0.2041	0.00	0.1994	0.2109
TOTE loader	0.4626	0.00	0.4535	0.4758
TOTE Ship	0.3215	0.00	0.3136	0.3253
TOTE Ship increased	0.00	0.00	0.00	0.00
TOTE truck loader	0.4339	0.00	0.4283	0.4406
TOTE unloader	0.4349	0.00	0.4300	0.4416



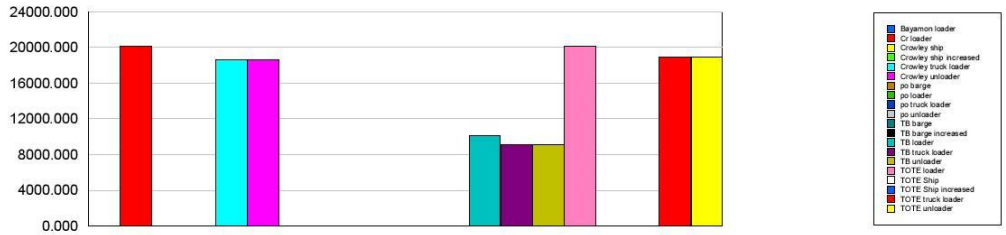
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	20161.88	0.40	20161.00	20164.00
Crowley ship	56.0000	0.00	56.0000	56.0000
Crowley ship increased	0.00	0.00	0.00	0.00
Crowley truck loader	18583.64	22.89	18497.00	18720.00
Crowley unloader	18606.52	22.81	18506.00	18720.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	30.0000	0.00	30.0000	30.0000
TB barge increased	0.00	0.00	0.00	0.00
TB loader	10081.72	0.35	10081.00	10084.00
TB truck loader	9100.00	0.00	9100.00	9100.00
TB unloader	9100.00	0.00	9100.00	9100.00
TOTE loader	20162.24	0.64	20161.00	20167.00
TOTE Ship	22.0000	0.00	22.0000	22.0000
TOTE Ship increased	0.00	0.00	0.00	0.00
TOTE truck loader	18900.00	0.00	18900.00	18900.00
TOTE unloader	18900.00	0.00	18900.00	18900.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	0.00	0.00	0.00	0.00	0.00	0.00
Crowley Deliverable	7.9187	0.31	6.7439	9.4606	0.00	123.00
Crowley inventory	1531.18	1.31	1525.15	1537.30	0.00	1759.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	4.3661	0.21	3.5104	5.2449	0.00	104.00
TB inventory	893.24	6.94	861.53	924.22	0.00	1235.00
TOTE Deliverable	12.8420	0.45	11.1068	14.8225	0.00	168.00
TOTE inventory	1232.83	2.27	1217.17	1239.95	0.00	1576.00

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	4.5055	0.24	3.7490	6.6283	0.00	94.0000
Crowley Deliverable	512.06	47.97	249.75	738.96	0.00	1498.00
Crowley inventory	5657.25	64.63	5120.43	5866.88	0.00	9511.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	55.5200	0.45	53.5158	57.1255	0.00	589.00
TB inventory	1363.65	4.42	1342.71	1386.22	0.00	2570.00
TOTE Deliverable	224.56	7.35	192.91	257.07	0.00	1230.00
TOTE inventory	2167.85	9.11	2130.99	2203.52	0.00	4819.00

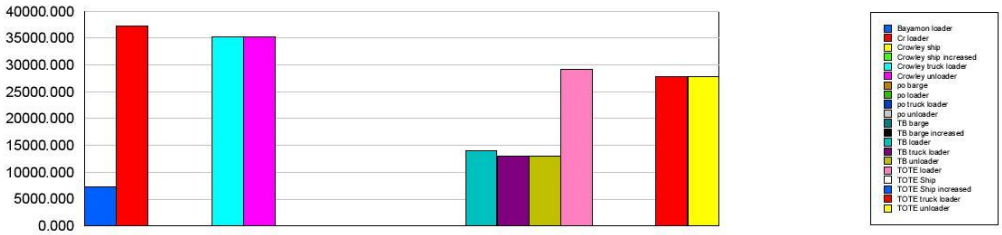
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	7252.64	25.85	7139.00	7387.00
Cr loader	37187.48	0.80	37186.00	37193.00
Crowley ship	10.1200	0.14	10.0000	11.0000
Crowley ship increased	92.8800	0.14	92.0000	93.0000
Crowley truck loader	35280.48	0.99	35280.00	35292.00
Crowley unloader	35280.68	1.32	35280.00	35296.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	5.0000	0.00	5.0000	5.0000
TB barge increased	38.0000	0.00	38.0000	38.0000
TB loader	14089.88	0.52	14089.00	14094.00
TB truck loader	13000.00	0.00	13000.00	13000.00
TB unloader	13000.00	0.00	13000.00	13000.00
TOTE loader	29185.92	0.49	29184.00	29189.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	28.0000	0.00	28.0000	28.0000
TOTE truck loader	27896.56	5.57	27835.00	27900.00
TOTE unloader	27897.48	5.20	27837.00	27900.00



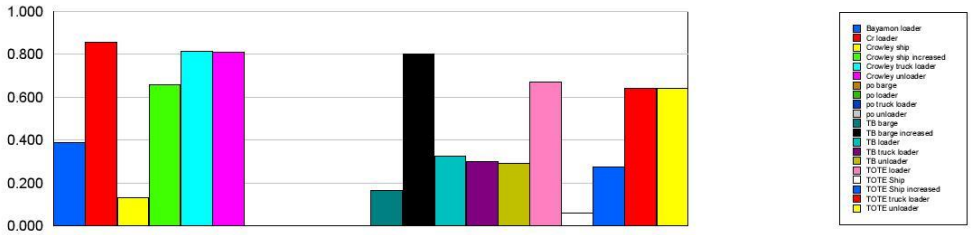
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.3870	0.00	0.3723	0.3974
Cr loader	0.8542	0.00	0.8376	0.8680
Crowley ship	0.1325	0.00	0.1302	0.1451
Crowley ship increased	0.6581	0.00	0.6507	0.6624
Crowley truck loader	0.8123	0.00	0.7974	0.8282
Crowley unloader	0.8087	0.00	0.7981	0.8193
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1632	0.00	0.1598	0.1671
TB barge increased	0.8009	0.00	0.7937	0.8070
TB loader	0.3247	0.00	0.3156	0.3325
TB truck loader	0.2987	0.00	0.2900	0.3106
TB unloader	0.2911	0.00	0.2854	0.2972
TOTE loader	0.6707	0.00	0.6620	0.6820
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092
TOTE Ship increased	0.2738	0.00	0.2675	0.2786
TOTE truck loader	0.6422	0.00	0.6334	0.6507
TOTE unloader	0.6411	0.00	0.6324	0.6475



Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3870	0.00	0.3723	0.3974	0.00	1.0000
Cr loader	0.8542	0.00	0.8376	0.8680	0.00	1.0000
Crowley ship	0.6625	0.01	0.6510	0.7254	0.00	5.0000
Crowley ship increased	5.9232	0.01	5.8561	5.9614	0.00	9.0000
Crowley truck loader	0.8123	0.00	0.7974	0.8282	0.00	1.0000
Crowley unloader	0.8087	0.00	0.7981	0.8193	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3263	0.00	0.3197	0.3342	0.00	2.0000
TB barge increased	2.4028	0.00	2.3811	2.4209	0.00	3.0000
TB loader	0.3247	0.00	0.3156	0.3325	0.00	1.0000
TB truck loader	0.2987	0.00	0.2900	0.3106	0.00	1.0000
TB unloader	0.2911	0.00	0.2854	0.2972	0.00	1.0000
TOTE loader	0.6707	0.00	0.6620	0.6820	0.00	1.0000
TOTE Ship	0.1193	0.00	0.1162	0.1240	0.00	2.0000
TOTE Ship increased	0.8215	0.00	0.8026	0.8358	0.00	2.0000
TOTE truck loader	0.6422	0.00	0.6334	0.6507	0.00	1.0000
TOTE unloader	0.6411	0.00	0.6324	0.6475	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3870	0.00	0.3723	0.3974	0.00	1.0000
Cr loader	0.8542	0.00	0.8376	0.8680	0.00	1.0000
Crowley ship	0.1325	0.00	0.1302	0.1451	0.00	1.0000
Crowley ship increased	0.6581	0.00	0.6507	0.6624	0.00	1.0000
Crowley truck loader	0.8123	0.00	0.7974	0.8282	0.00	1.0000
Crowley unloader	0.8087	0.00	0.7981	0.8193	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1632	0.00	0.1598	0.1671	0.00	1.0000
TB barge increased	0.8009	0.00	0.7937	0.8070	0.00	1.0000
TB loader	0.3247	0.00	0.3156	0.3325	0.00	1.0000
TB truck loader	0.2987	0.00	0.2900	0.3106	0.00	1.0000
TB unloader	0.2911	0.00	0.2854	0.2972	0.00	1.0000
TOTE loader	0.6707	0.00	0.6620	0.6820	0.00	1.0000
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092	0.00	1.0000
TOTE Ship increased	0.2738	0.00	0.2675	0.2786	0.00	0.6667
TOTE truck loader	0.6422	0.00	0.6334	0.6507	0.00	1.0000
TOTE unloader	0.6411	0.00	0.6324	0.6475	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	4.1185	0.24	3.3553	6.2350	0.00	93.0000
Cr JAX PPT.Queue	1476.54	52.77	1220.03	1772.12	0.00	4368.00
Cr road delay 1.Queue	15.3752	2.20	8.0237	30.9924	0.00	1211.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	179.18	0.30	178.15	180.76	0.00	360.00
Crowley truck loading 2.Queue	0.6718	0.01	0.6073	0.7445	0.00	29.0000
Crowley truck loading.Queue	434.99	47.85	177.92	661.54	0.00	1497.00
Crowley unload.Queue	1044.25	56.83	815.92	1336.88	0.00	2584.00
Crowley water delay.Queue	0.07463874	0.00	0.04530159	0.08279959	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.29	0.06	160.10	160.62	0.00	325.00
TB JAX PPT.Queue	1.0426	0.01	1.0032	1.0807	0.00	13.0000
TB road delay.Queue	4.5467	0.63	3.1719	8.0908	0.00	317.00
TB truck loading.Queue	4.7079	0.20	3.6362	5.6501	0.00	128.00
TB unload.Queue	49.0899	0.39	46.7836	50.9523	0.00	648.00
TB water delay.Queue	0.02778559	0.00	0.02529973	0.02919663	0.00	1.0000
TOTE avg TEU shipped.Queue	442.60	0.51	440.83	445.41	0.00	900.00
TOTE JAX PPT.Queue	35.6983	6.19	10.5985	69.0502	0.00	531.00
TOTE road delay.Queue	16.7381	1.08	10.6122	21.6767	0.00	910.00
TOTE truck loading.Queue	123.14	7.32	93.1432	157.26	0.00	1229.00
TOTE unload.Queue	577.72	8.83	524.06	623.32	0.00	2652.00
TOTE water delay.Queue	0.04351789	0.00	0.03804032	0.04800113	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1273	0.01	0.1073	0.1874	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.1323	0.00	0.1263	0.1393	0.00	3.0000
transit to TB_increased fleet.Queue	0.4865	0.01	0.4361	0.5240	0.00	3.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	1.1445	0.06	0.9283	1.7250	0.00	11.4679
Cr JAX PPT.Queue	80.0462	2.86	66.1373	96.0710	0.00	200.22
Cr road delay 1.Queue	36.6421	2.69	22.3730	51.5942	0.00128500	120.00
Crowley avg TEU shipped.Queue	9.7290	0.02	9.6729	9.8146	0.00	30.9016
Crowley truck loading 2.Queue	0.1867	0.00	0.1715	0.2060	0.00	1.9760
Crowley truck loading.Queue	31.2922	3.45	12.8074	47.5886	0.00	104.77
Crowley unload.Queue	59.6698	3.25	46.6241	76.3932	0.00	120.31
Crowley water delay.Queue	52.0639	1.04	45.6640	55.6413	29.9036	71.8232
TB avg TEU shipped.Queue	23.0444	0.01	23.0167	23.0916	0.00	54.5610
TB JAX PPT.Queue	0.1492	0.00	0.1435	0.1546	0.00	1.3029
TB road delay.Queue	34.1468	4.20	22.6006	53.3519	0.00	120.00
TB truck loading.Queue	0.7301	0.03	0.5639	0.8762	0.00	6.9022
TB unload.Queue	7.6127	0.06	7.2551	7.9015	0.00	30.0767
TB water delay.Queue	56.0158	0.89	51.0043	58.8604	51.0043	58.8604
TOTE avg TEU shipped.Queue	30.7663	0.04	30.6416	30.9629	0.00	75.3762
TOTE JAX PPT.Queue	2.4658	0.43	0.7321	4.7698	0.00	26.7464
TOTE road delay.Queue	42.9249	1.46	32.1716	48.0222	0.00387138	120.00
TOTE truck loading.Queue	8.8987	0.53	6.7303	11.3630	0.00	59.8059
TOTE unload.Queue	41.7449	0.64	37.8675	45.0401	0.00	122.87
TOTE water delay.Queue	43.8660	1.08	38.3446	48.3851	14.1064	71.2841
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	25.2696	1.34	21.6362	34.3420	0.00	105.92
transit to TB.Queue	53.3500	0.61	50.9224	56.1647	0.00	140.96
transit to TB_increased fleet.Queue	25.8081	0.49	23.1388	27.7973	0.00	113.86
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	98.0800	0.11	98.0000	99.00
Crowley freight	27279.16	0.33	27279.00	27283.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	13000.00	0.00	13000.00	13000.00
TB Ship	40.0000	0.00	40.0000	40.0000
To Ship	31.0000	0.00	31.0000	31.0000
TOTE freight	27892.16	8.86	27806.00	27900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	6.7877	0.01	6.7365	6.8665	0.00	13.0000
Crowley freight	4395.11	54.01	3975.05	4586.20	0.00	7346.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	1309.08	16.78	1207.31	1412.05	0.00	3006.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	1372.50	4.61	1350.39	1396.80	0.00	2780.00
TB Ship	3.3757	0.01	3.3164	3.4387	0.00	7.0000
To Ship	0.9844	0.00	0.9637	0.9945	0.00	4.0000
TOTE freight	2203.91	9.06	2167.43	2239.10	0.00	5141.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

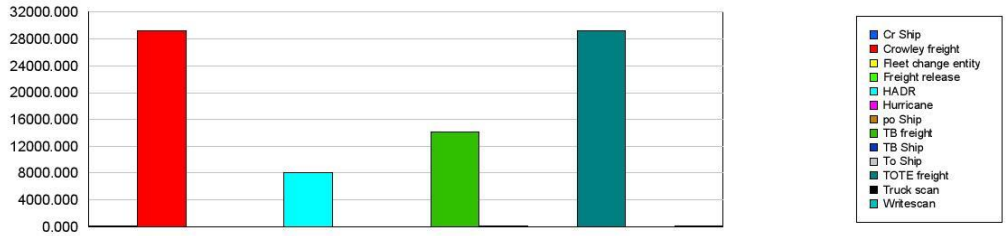
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	103.00	0.00	103.00	103.00
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	43.0000	0.00	43.0000	43.0000
To Ship	32.0000	0.00	32.0000	32.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	319.23	3.99	288.19	333.36	144.14	559.30
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	329.85	4.23	304.20	355.79	146.37	429.79
TB freight	205.21	0.71	201.78	208.98	140.79	515.44
TOTE freight	156.78	0.66	154.13	159.31	93.9932	501.31
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	139.09	0.13	138.39	139.85	122.87	494.28
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	134.23	0.11	133.75	135.16	123.34	144.96
TB freight	140.67	0.23	139.20	141.84	125.27	496.71
TOTE freight	68.9576	0.23	67.4454	70.0273	51.2688	427.44
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	180.14	4.00	148.69	194.02	14.6309	331.78
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	195.61	4.23	170.17	221.66	14.9871	299.14
TB freight	64.5384	0.52	62.2136	67.1430	12.9610	175.08
TOTE freight	87.8208	0.66	85.1653	90.7428	38.3240	176.33
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System

	Average
Number Out	76,259

Scenario 2

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System

	Average
Number Out	76,261

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	139.05	0.12	138.41	139.63	124.28	497.48
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	133.49	0.10	132.99	133.96	124.28	145.87
TB freight	140.60	0.23	139.31	141.80	123.76	449.36
TOTE freight	68.8861	0.17	67.9606	69.6213	53.6786	424.93
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	171.70	3.01	156.79	186.99	14.9973	308.29
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	221.98	3.87	204.47	238.79	14.9871	308.06
TB freight	64.5213	0.46	62.2208	66.5673	13.2324	174.23
TOTE freight	87.9738	0.62	85.7984	91.2227	39.7684	176.33
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	310.76	2.98	296.34	325.92	142.32	550.16
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	355.47	3.88	337.84	372.23	146.37	442.77
TB freight	205.12	0.64	202.37	208.06	140.79	533.68
TOTE freight	156.86	0.59	154.73	160.04	95.0349	495.64
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

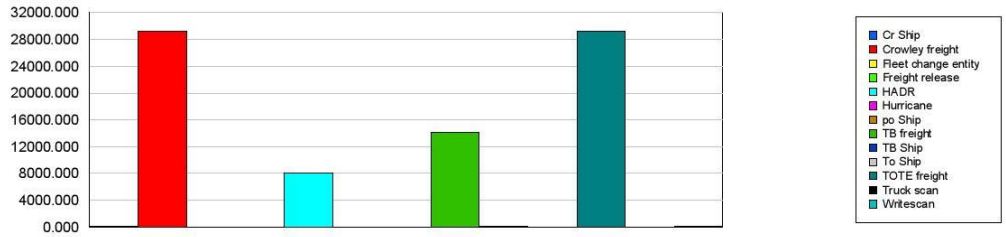
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	103.00	0.00	103.00	103.00
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	43.0000	0.00	43.0000	43.0000
To Ship	32.0000	0.00	32.0000	32.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	98.1600	0.15	98.0000	99.00
Crowley freight	27279.64	1.14	27276.00	27292.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	13001.28	1.89	13000.00	13020.00
TB Ship	40.0800	0.11	40.0000	41.0000
To Ship	31.0000	0.00	31.0000	31.0000
TOTE freight	27892.40	4.76	27859.00	27900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	6.7862	0.01	6.7394	6.8698	0.00	13.0000
Crowley freight	4280.44	40.27	4085.37	4485.63	0.00	7292.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	1410.78	15.39	1340.81	1477.28	0.00	3208.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	1371.89	4.11	1354.15	1390.85	0.00	2780.00
TB Ship	3.3744	0.01	3.3243	3.4219	0.00	7.0000
To Ship	0.9829	0.00	0.9726	0.9921	0.00	4.0000
TOTE freight	2205.04	8.17	2175.55	2248.51	0.00	5141.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr JAX PPT.Queue	81.0515	2.39	71.9464	92.8002	0.00	191.28
Cr road delay 1.Queue	36.6421	2.69	22.3730	51.5942	0.00128500	120.00
Crowley avg TEU shipped.Queue	9.7371	0.01	9.6834	9.7979	0.00	30.9016
Crowley truck loading.Queue	22.5141	2.64	11.8405	33.9078	0.00	59.3877
Crowley unload.Queue	60.6736	3.29	47.0576	76.9869	0.00	118.63
Crowley water delay.Queue	52.0639	1.04	45.6640	55.6413	29.9036	71.8232
TB avg TEU shipped.Queue	23.0502	0.01	23.0140	23.1087	0.00	54.7513
TB JAX PPT.Queue	0.1485	0.00	0.1431	0.1534	0.00	1.3029
TB road delay.Queue	34.1468	4.20	22.6006	53.3519	0.00	120.00
TB truck loading.Queue	0.7369	0.04	0.5966	0.8888	0.00	5.8175
TB unload.Queue	7.5916	0.04	7.3588	7.7361	0.00	30.0767
TB water delay.Queue	56.0158	0.89	51.0043	58.8604	51.0043	58.8604
TOTE avg TEU shipped.Queue	30.7493	0.03	30.5839	30.8581	0.00	75.3133
TOTE JAX PPT.Queue	2.5950	0.43	0.8906	4.8368	0.00	27.1369
TOTE road delay.Queue	42.9249	1.46	32.1716	48.0222	0.00387138	120.00
TOTE truck loading.Queue	8.8735	0.56	6.0881	11.0111	0.00	55.2186
TOTE unload.Queue	41.8095	0.73	37.9575	44.9543	0.00	123.63
TOTE water delay.Queue	43.8660	1.08	38.3446	48.3851	14.1064	71.2841
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	25.2696	1.34	21.6362	34.3420	0.00	105.92
transit to TB.Queue	53.3500	0.61	50.9224	56.1647	0.00	140.96
transit to TB_increased fleet.Queue	25.7978	0.43	23.7232	27.5694	0.00	113.17
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Cr JAX PPT.Queue	1495.06	44.03	1327.08	1711.74	0.00	4253.00
Cr road delay 1.Queue	15.3752	2.20	8.0237	30.9924	0.00	1211.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	179.33	0.20	178.34	180.45	0.00	360.00
Crowley truck loading 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loading.Queue	394.01	46.27	207.34	593.39	0.00	1283.00
Crowley unload.Queue	1061.87	57.54	823.51	1347.27	0.00	2514.00
Crowley water delay.Queue	0.07463874	0.00	0.04530159	0.08279959	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.33	0.07	160.08	160.74	0.00	325.00
TB JAX PPT.Queue	1.0377	0.01	1.0000	1.0719	0.00	13.0000
TB road delay.Queue	4.5467	0.63	3.1719	8.0908	0.00	317.00
TB truck loading.Queue	4.7527	0.23	3.8474	5.7311	0.00	112.00
TB unload.Queue	48.9839	0.26	47.4528	49.8856	0.00	648.00
TB water delay.Queue	0.02778559	0.00	0.02529973	0.02919663	0.00	1.0000
TOTE avg TEU shipped.Queue	442.36	0.41	440.00	443.91	0.00	900.00
TOTE JAX PPT.Queue	37.5681	6.17	12.8934	70.0227	0.00	580.00
TOTE road delay.Queue	16.7381	1.08	10.6122	21.6767	0.00	910.00
TOTE truck loading.Queue	122.80	7.81	84.2553	152.39	0.00	1233.00
TOTE unload.Queue	578.61	10.09	525.30	622.14	0.00	2551.00
TOTE water delay.Queue	0.04351789	0.00	0.03804032	0.04800113	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1273	0.01	0.1073	0.1874	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.1323	0.00	0.1263	0.1393	0.00	3.0000
transit to TB_increased fleet.Queue	0.4863	0.01	0.4472	0.5197	0.00	3.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.8550	0.00	0.8410	0.8640	0.00	1.0000
Crowley ship	0.1325	0.00	0.1302	0.1451	0.00	1.0000
Crowley ship increased	0.6580	0.00	0.6504	0.6605	0.00	1.0000
Crowley truck loader	0.8105	0.00	0.7979	0.8207	0.00	1.0000
Crowley unloader	0.8110	0.00	0.8007	0.8206	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1632	0.00	0.1598	0.1671	0.00	1.0000
TB barge increased	0.8006	0.00	0.7953	0.8056	0.00	1.0000
TB loader	0.3235	0.00	0.3148	0.3325	0.00	1.0000
TB truck loader	0.2989	0.00	0.2919	0.3092	0.00	1.0000
TB unloader	0.2909	0.00	0.2848	0.2979	0.00	1.0000
TOTE loader	0.6709	0.00	0.6622	0.6793	0.00	1.0000
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092	0.00	1.0000
TOTE Ship increased	0.2733	0.00	0.2695	0.2764	0.00	0.6667
TOTE truck loader	0.6417	0.00	0.6303	0.6546	0.00	1.0000
TOTE unloader	0.6413	0.00	0.6190	0.6525	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.8550	0.00	0.8410	0.8640	0.00	1.0000
Crowley ship	0.6625	0.01	0.6510	0.7254	0.00	5.0000
Crowley ship increased	5.9218	0.01	5.8532	5.9448	0.00	9.0000
Crowley truck loader	0.8105	0.00	0.7979	0.8207	0.00	1.0000
Crowley unloader	0.8110	0.00	0.8007	0.8206	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3263	0.00	0.3197	0.3342	0.00	2.0000
TB barge increased	2.4018	0.00	2.3858	2.4167	0.00	3.0000
TB loader	0.3235	0.00	0.3148	0.3325	0.00	1.0000
TB truck loader	0.2989	0.00	0.2919	0.3092	0.00	1.0000
TB unloader	0.2909	0.00	0.2848	0.2979	0.00	1.0000
TOTE loader	0.6709	0.00	0.6622	0.6793	0.00	1.0000
TOTE Ship	0.1193	0.00	0.1162	0.1240	0.00	2.0000
TOTE Ship increased	0.8200	0.00	0.8085	0.8291	0.00	2.0000
TOTE truck loader	0.6417	0.00	0.6303	0.6546	0.00	1.0000
TOTE unloader	0.6413	0.00	0.6190	0.6525	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

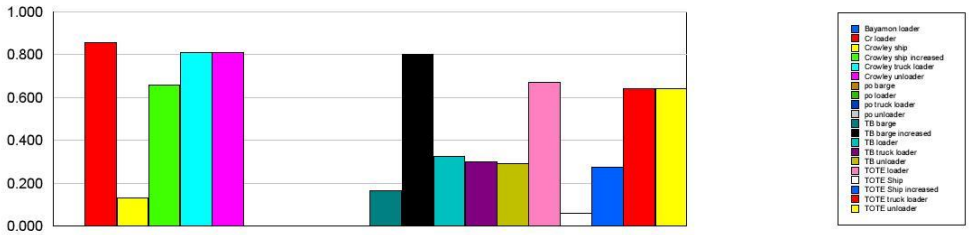
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	0.8550	0.00	0.8410	0.8640
Crowley ship	0.1325	0.00	0.1302	0.1451
Crowley ship increased	0.6580	0.00	0.6504	0.6605
Crowley truck loader	0.8105	0.00	0.7979	0.8207
Crowley unloader	0.8110	0.00	0.8007	0.8206
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1632	0.00	0.1598	0.1671
TB barge increased	0.8006	0.00	0.7953	0.8056
TB loader	0.3235	0.00	0.3148	0.3325
TB truck loader	0.2989	0.00	0.2919	0.3092
TB unloader	0.2909	0.00	0.2848	0.2979
TOTE loader	0.6709	0.00	0.6622	0.6793
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092
TOTE Ship increased	0.2733	0.00	0.2695	0.2764
TOTE truck loader	0.6417	0.00	0.6303	0.6546
TOTE unloader	0.6413	0.00	0.6190	0.6525



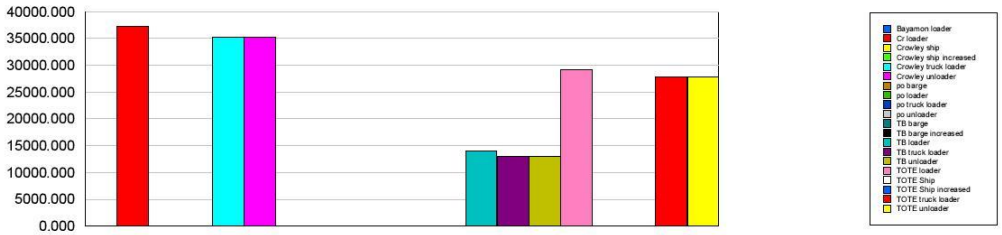
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	37186.64	0.56	37184.00	37190.00
Crowley ship	10.1200	0.14	10.0000	11.0000
Crowley ship increased	92.8800	0.14	92.0000	93.0000
Crowley truck loader	35281.64	1.98	35280.00	35302.00
Crowley unloader	35281.96	2.30	35280.00	35305.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	5.0000	0.00	5.0000	5.0000
TB barge increased	38.0000	0.00	38.0000	38.0000
TB loader	14090.16	0.55	14089.00	14093.00
TB truck loader	13002.08	3.06	13000.00	13032.00
TB unloader	13003.00	4.34	13000.00	13043.00
TOTE loader	29186.04	0.65	29182.00	29190.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	28.0000	0.00	28.0000	28.0000
TOTE truck loader	27898.84	1.52	27883.00	27900.00
TOTE unloader	27900.00	0.00	27900.00	27900.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	0.00	0.00	0.00	0.00	0.00	0.00
Crowley Deliverable	470.47	46.81	279.43	669.28	0.00	1284.00
Crowley inventory	5651.43	55.72	5376.25	5924.72	0.00	9489.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	55.3860	0.62	52.7594	57.9023	0.00	591.00
TB inventory	1363.05	3.90	1346.35	1380.28	0.00	2570.00
TOTE Deliverable	224.54	8.01	184.45	256.43	0.00	1234.00
TOTE inventory	2168.98	8.64	2139.07	2214.10	0.00	4797.00

Scenario 3

1:24:12PM **Category Overview** January 14, 2019

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	75,216

Model Filename: I:\Thesis\Test file\v9000 Page 1 of 13

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	140.23	0.14	139.60	140.82	125.19	475.21
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	114.47	0.28	113.39	115.41	53.4228	421.98
TB freight	140.63	0.14	139.94	141.32	124.72	425.46
TOTE freight	68.0188	0.22	66.8768	69.4399	51.5167	420.98
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	84.3248	1.86	72.2337	90.2234	15.0092	242.54
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	146.04	2.07	137.68	156.22	12.5459	375.60
TB freight	203.85	2.87	189.31	215.04	11.5471	377.16
TOTE freight	110.28	1.41	104.23	116.26	39.2635	227.21
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	224.56	1.79	212.77	230.65	141.90	545.95
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	260.51	2.23	251.96	271.31	96.7926	511.47
TB freight	344.49	2.92	329.68	355.89	142.11	514.66
TOTE freight	178.30	1.37	171.76	183.43	94.6852	506.22
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

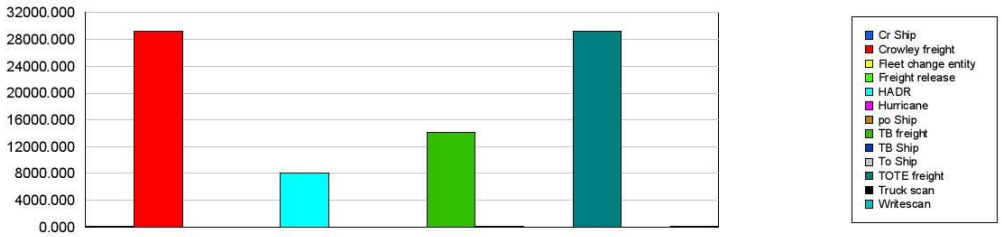
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	88.0000	0.00	88.0000	88.0000
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	51.0000	0.00	51.0000	51.0000
To Ship	35.0000	0.00	35.0000	35.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	83.7200	0.19	83.0000	84.0000
Crowley freight	27267.52	19.06	27190.00	27414.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	11977.24	30.49	11849.00	12225.00
TB Ship	45.0400	0.08	45.0000	46.0000
To Ship	34.0000	0.00	34.0000	34.0000
TOTE freight	27883.48	19.92	27773.00	27974.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	5.8085	0.01	5.7725	5.8630	0.00	13.0000
Crowley freight	3113.69	24.07	2954.71	3196.02	0.00	6493.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	1033.90	8.87	999.95	1076.78	0.00	2339.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	2231.37	17.44	2142.65	2299.12	0.00	2994.00
TB Ship	7.3595	0.07	6.9802	7.6455	0.00	11.0000
To Ship	1.0707	0.00	1.0519	1.0917	0.00	4.0000
TOTE freight	2501.41	18.82	2413.88	2572.25	0.00	5539.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr JAX PPT.Queue	16.1950	1.22	11.8774	22.1359	0.00	86.8480
Cr road delay 1.Queue	39.3642	3.08	23.6591	53.0050	0.00549467	120.00
Crowley avg TEU shipped.Queue	11.3388	0.03	11.1919	11.4431	0.00	31.6871
Crowley truck loading.Queue	14.6794	1.00	10.1695	19.5208	0.00	54.5847
Crowley unload.Queue	37.3223	1.96	28.6267	44.5487	0.00	107.88
Crowley water delay.Queue	49.8522	1.51	42.3819	55.2982	27.7436	71.0098
TB avg TEU shipped.Queue	19.3787	0.04	19.1888	19.6331	0.00	54.4023
TB JAX PPT.Queue	0.1626	0.00	0.1567	0.1689	0.00	1.5453
TB road delay.Queue	25.1450	1.80	20.6298	38.2485	0.00955533	119.94
TB truck loading.Queue	0.8052	0.05	0.6268	1.0826	0.00	15.6973
TB unload.Queue	8.3729	0.32	7.4232	10.2952	0.00	33.5031
TB water delay.Queue	66.8066	1.18	60.4721	70.9081	60.4721	70.9081
TOTE avg TEU shipped.Queue	28.2809	0.04	28.0420	28.4487	0.00	75.8440
TOTE JAX PPT.Queue	15.3804	0.84	11.9204	18.9970	0.00	73.7682
TOTE road delay.Queue	41.8959	1.69	34.8990	50.7112	0.00265062	120.00
TOTE truck loading.Queue	14.3997	1.12	8.5987	20.0967	0.00	66.4269
TOTE unload.Queue	49.8046	1.16	45.9217	57.3114	0.00	133.85
TOTE water delay.Queue	45.0791	1.02	41.0613	52.6220	14.5830	71.8107
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	24.3919	1.03	20.8247	32.0160	0.00	101.84
transit to TB.Queue	79.8482	2.08	75.7083	102.01	0.00	235.59
transit to TB_increased fleet.Queue	187.47	3.15	170.52	198.92	0.00	323.58
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Cr JAX PPT.Queue	255.92	19.30	187.62	349.98	0.00	1849.00
Cr road delay 1.Queue	16.0279	2.47	7.0766	28.0801	0.00	1068.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	178.90	0.37	176.94	180.25	0.00	360.00
Crowley truck loading 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loading.Queue	218.11	14.77	151.56	289.33	0.00	1151.00
Crowley unload.Queue	555.11	29.07	426.86	662.24	0.00	2387.00
Crowley water delay.Queue	0.06882212	0.01	0.04204557	0.08228901	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.72	0.19	159.75	161.63	0.00	325.00
TB JAX PPT.Queue	1.3508	0.01	1.3022	1.4054	0.00	28.0000
TB road delay.Queue	3.5088	0.15	3.0446	4.9898	0.00	337.00
TB truck loading.Queue	5.8481	0.35	4.5472	7.8538	0.00	338.00
TB unload.Queue	60.7886	2.32	54.6846	74.6858	0.00	714.00
TB water delay.Queue	0.03313821	0.00	0.02999609	0.03517267	0.00	1.0000
TOTE avg TEU shipped.Queue	444.51	0.54	441.71	446.36	0.00	900.00
TOTE JAX PPT.Queue	243.02	13.32	187.68	301.05	0.00	1636.00
TOTE road delay.Queue	15.3760	1.19	10.4770	22.0855	0.00	878.00
TOTE truck loading.Queue	218.33	16.98	130.52	304.54	0.00	1422.00
TOTE unload.Queue	755.87	17.64	697.03	869.91	0.00	2832.00
TOTE water delay.Queue	0.04472133	0.00	0.04073542	0.05220432	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1223	0.01	0.1033	0.1747	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.2397	0.01	0.2253	0.3542	0.00	4.0000
transit to TB_increased fleet.Queue	4.0270	0.07	3.6507	4.2969	0.00	8.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.7330	0.00	0.7208	0.7456	0.00	1.0000
Crowley ship	0.1320	0.00	0.1291	0.1443	0.00	1.0000
Crowley ship increased	0.5508	0.00	0.5431	0.5538	0.00	1.0000
Crowley truck loader	0.6889	0.00	0.6803	0.7018	0.00	1.0000
Crowley unloader	0.6894	0.00	0.6814	0.6978	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1974	0.00	0.1938	0.2287	0.00	1.0000
TB barge increased	0.8883	0.00	0.8795	0.8913	0.00	1.0000
TB loader	0.3864	0.00	0.3779	0.3922	0.00	1.0000
TB truck loader	0.3371	0.00	0.3315	0.3457	0.00	1.0000
TB unloader	0.3273	0.00	0.3208	0.3334	0.00	1.0000
TOTE loader	0.7315	0.00	0.7220	0.7382	0.00	1.0000
TOTE Ship	0.05950699	0.00	0.05688518	0.06158250	0.00	1.0000
TOTE Ship increased	0.3023	0.00	0.2959	0.3079	0.00	0.6667
TOTE truck loader	0.7019	0.00	0.6876	0.7134	0.00	1.0000
TOTE unloader	0.7028	0.00	0.6916	0.7116	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.7330	0.00	0.7208	0.7456	0.00	1.0000
Crowley ship	0.6601	0.01	0.6453	0.7215	0.00	5.0000
Crowley ship increased	4.9574	0.01	4.8880	4.9846	0.00	9.0000
Crowley truck loader	0.6889	0.00	0.6803	0.7018	0.00	1.0000
Crowley unloader	0.6894	0.00	0.6814	0.6978	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3949	0.01	0.3877	0.4573	0.00	2.0000
TB barge increased	2.6648	0.00	2.6385	2.6739	0.00	3.0000
TB loader	0.3864	0.00	0.3779	0.3922	0.00	1.0000
TB truck loader	0.3371	0.00	0.3315	0.3457	0.00	1.0000
TB unloader	0.3273	0.00	0.3208	0.3334	0.00	1.0000
TOTE loader	0.7315	0.00	0.7220	0.7382	0.00	1.0000
TOTE Ship	0.1190	0.00	0.1138	0.1232	0.00	2.0000
TOTE Ship increased	0.9070	0.00	0.8877	0.9236	0.00	2.0000
TOTE truck loader	0.7019	0.00	0.6876	0.7134	0.00	1.0000
TOTE unloader	0.7028	0.00	0.6916	0.7116	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

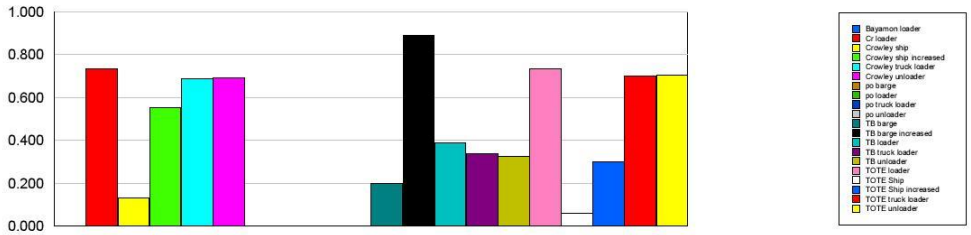
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	0.7330	0.00	0.7208	0.7456
Crowley ship	0.1320	0.00	0.1291	0.1443
Crowley ship increased	0.5508	0.00	0.5431	0.5538
Crowley truck loader	0.6889	0.00	0.6803	0.7018
Crowley unloader	0.6894	0.00	0.6814	0.6978
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1974	0.00	0.1938	0.2287
TB barge increased	0.8883	0.00	0.8795	0.8913
TB loader	0.3864	0.00	0.3779	0.3922
TB truck loader	0.3371	0.00	0.3315	0.3457
TB unloader	0.3273	0.00	0.3208	0.3334
TOTE loader	0.7315	0.00	0.7220	0.7382
TOTE Ship	0.05950699	0.00	0.05688518	0.06158250
TOTE Ship increased	0.3023	0.00	0.2959	0.3079
TOTE truck loader	0.7019	0.00	0.6876	0.7134
TOTE unloader	0.7028	0.00	0.6916	0.7116



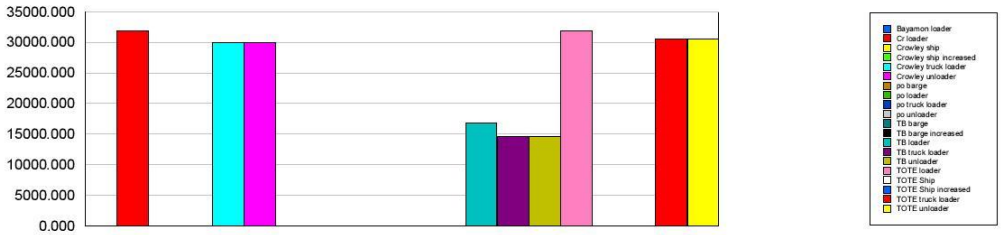
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	31859.04	22.64	31731.00	31994.00
Crowley ship	10.0800	0.11	10.0000	11.0000
Crowley ship increased	77.9200	0.11	77.0000	78.0000
Crowley truck loader	29956.96	37.63	29880.00	30240.00
Crowley unloader	29965.40	40.03	29880.00	30240.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	6.0400	0.08	6.0000	7.0000
TB barge increased	42.0000	0.00	42.0000	42.0000
TB loader	16750.56	22.43	16647.00	16865.00
TB truck loader	14638.00	26.83	14625.00	14950.00
TB unloader	14638.00	26.83	14625.00	14950.00
TOTE loader	31852.84	18.04	31740.00	31948.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	31.0000	0.00	31.0000	31.0000
TOTE truck loader	30565.96	22.13	30416.00	30600.00
TOTE unloader	30582.64	12.93	30498.00	30600.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	0.00	0.00	0.00	0.00	0.00	0.00
Crowley Deliverable	309.90	15.02	246.37	379.86	0.00	1152.00
Crowley inventory	3392.32	29.08	3204.30	3489.21	0.00	7113.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	63.6871	0.50	61.7550	66.2293	0.00	665.00
TB inventory	2679.09	23.16	2553.90	2768.84	0.00	3686.00
TOTE Deliverable	318.87	16.85	229.80	403.55	0.00	1423.00
TOTE inventory	2727.37	22.75	2620.98	2820.01	0.00	6151.00

Scenario 4

1:43:28PM **Category Overview** January 14, 2019

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	76,055

Model Filename: I:\Thesis\Test file\v9000 Page 1 of 13

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	140.05	0.16	139.49	140.80	124.03	495.71
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	109.08	0.20	107.95	109.76	51.1664	419.66
TB freight	140.17	0.14	139.54	140.92	125.65	425.15
TOTE freight	68.1851	0.17	67.6367	69.2310	51.1664	399.78
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	90.0020	1.89	80.2398	96.9401	14.9527	237.81
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	130.58	2.28	117.59	140.04	13.0145	253.40
TB freight	132.57	1.42	127.15	140.37	12.6546	254.11
TOTE freight	115.98	2.82	87.2453	124.86	39.1155	236.19
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	230.06	1.81	220.78	236.48	142.96	553.71
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	239.66	2.32	227.35	249.27	97.5852	503.87
TB freight	272.75	1.47	267.22	280.48	142.14	510.92
TOTE freight	184.17	2.74	156.48	193.15	94.8847	510.93
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

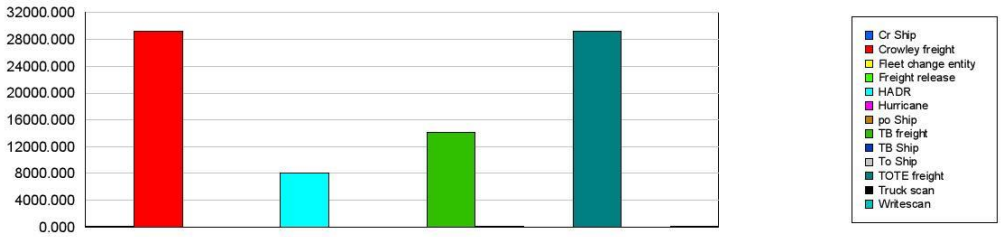
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	89.2000	0.17	89.0000	90.0000
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	48.0000	0.00	48.0000	48.0000
To Ship	35.5600	0.21	35.0000	36.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	85.0000	0.00	85.0000	85.0000
Crowley freight	27316.68	19.93	27205.00	27395.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	13017.52	13.92	12943.00	13069.00
TB Ship	45.0000	0.00	45.0000	45.0000
To Ship	35.0000	0.00	35.0000	35.0000
TOTE freight	27632.52	23.18	27515.00	27743.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	5.9051	0.01	5.8467	5.9639	0.00	13.0000
Crowley freight	3189.86	24.83	3061.13	3280.03	0.00	6561.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	951.16	9.22	902.30	989.29	0.00	2462.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	1808.81	9.18	1774.98	1856.45	0.00	2749.00
TB Ship	5.3889	0.03	5.2574	5.5511	0.00	8.0000
To Ship	1.0862	0.00	1.0518	1.0995	0.00	4.0000
TOTE freight	2574.60	37.72	2194.09	2697.62	0.00	5659.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr JAX PPT.Queue	19.5578	1.07	14.8408	25.3380	0.00	95.0001
Cr road delay 1.Queue	37.1813	3.00	26.1497	51.6803	0.00292638	120.00
Crowley avg TEU shipped.Queue	11.1370	0.02	11.0599	11.2439	0.00	30.6017
Crowley truck loading.Queue	15.5543	1.11	9.5567	19.7787	0.00	53.4445
Crowley unload.Queue	39.5028	2.11	27.9285	45.3911	0.00	104.39
Crowley water delay.Queue	50.6578	1.66	39.6528	56.0311	28.9502	71.4670
TB avg TEU shipped.Queue	20.7144	0.03	20.5983	20.8890	0.00	54.5895
TB JAX PPT.Queue	0.1511	0.00	0.1430	0.1561	0.00	1.3792
TB road delay.Queue	26.7527	2.04	21.3255	41.5431	0.00386741	120.00
TB truck loading.Queue	0.7885	0.06	0.6137	1.1610	0.00	6.8160
TB unload.Queue	7.7641	0.17	7.2068	8.8091	0.00	30.7171
TB water delay.Queue	61.6491	1.09	56.9770	67.7286	56.9770	67.7286
TOTE avg TEU shipped.Queue	27.8142	0.07	27.5265	28.1445	0.00	75.8082
TOTE JAX PPT.Queue	19.7673	0.86	15.2961	23.2832	0.00	89.4385
TOTE road delay.Queue	44.1399	1.63	37.8657	52.9758	0.00	120.00
TOTE truck loading.Queue	16.4382	1.27	10.4769	21.5025	0.00	59.9208
TOTE unload.Queue	49.6890	2.46	25.4328	57.9760	0.00	129.43
TOTE water delay.Queue	42.8630	2.40	20.4757	51.4579	13.7525	69.9542
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	25.0085	1.35	21.6478	34.6816	0.00	107.67
transit to TB.Queue	74.8489	0.48	72.1189	77.3963	0.00	156.95
transit to TB_increased fleet.Queue	101.27	1.57	94.9417	108.95	0.00	194.96
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Cr JAX PPT.Queue	314.00	17.07	238.30	406.38	0.00	2006.00
Cr road delay 1.Queue	14.6750	2.53	8.0940	29.4291	0.00	1148.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	179.02	0.32	178.01	181.03	0.00	360.00
Crowley truck loading 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loading.Queue	235.52	16.89	144.67	298.12	0.00	1145.00
Crowley unload.Queue	598.92	32.13	423.05	688.97	0.00	2225.00
Crowley water delay.Queue	0.07098073	0.01	0.03933813	0.08337968	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.72	0.16	160.05	161.77	0.00	325.00
TB JAX PPT.Queue	1.1769	0.01	1.1114	1.2152	0.00	21.0000
TB road delay.Queue	3.5939	0.22	3.0702	5.0486	0.00	332.00
TB truck loading.Queue	5.7204	0.40	4.4523	8.4228	0.00	139.00
TB unload.Queue	56.3246	1.24	52.2815	63.9056	0.00	640.00
TB water delay.Queue	0.03057992	0.00	0.02826239	0.03359556	0.00	1.0000
TOTE avg TEU shipped.Queue	448.41	0.69	445.77	452.33	0.00	900.00
TOTE JAX PPT.Queue	317.66	13.83	245.63	373.91	0.00	1926.00
TOTE road delay.Queue	18.2458	2.37	12.3099	42.4385	0.00	1615.00
TOTE truck loading.Queue	251.76	19.43	160.07	329.45	0.00	1305.00
TOTE unload.Queue	765.70	37.86	392.79	894.15	0.00	2753.00
TOTE water delay.Queue	0.04211653	0.00	0.01015660	0.05104950	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1260	0.01	0.1074	0.1892	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.2228	0.00	0.2146	0.2303	0.00	3.0000
transit to TB_increased fleet.Queue	2.1098	0.03	1.9780	2.2699	0.00	5.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.7461	0.00	0.7322	0.7556	0.00	1.0000
Crowley ship	0.1325	0.00	0.1295	0.1458	0.00	1.0000
Crowley ship increased	0.5606	0.00	0.5530	0.5656	0.00	1.0000
Crowley truck loader	0.7001	0.00	0.6911	0.7110	0.00	1.0000
Crowley unloader	0.7012	0.00	0.6893	0.7125	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1966	0.00	0.1950	0.1991	0.00	1.0000
TB barge increased	0.8775	0.00	0.8751	0.8806	0.00	1.0000
TB loader	0.3606	0.00	0.3474	0.3689	0.00	1.0000
TB truck loader	0.3359	0.00	0.3295	0.3463	0.00	1.0000
TB unloader	0.3288	0.00	0.3166	0.3345	0.00	1.0000
TOTE loader	0.7453	0.00	0.7334	0.7552	0.00	1.0000
TOTE Ship	0.05960043	0.00	0.05753011	0.06157240	0.00	1.0000
TOTE Ship increased	0.3083	0.00	0.3059	0.3123	0.00	0.6667
TOTE truck loader	0.7104	0.00	0.7019	0.7243	0.00	1.0000
TOTE unloader	0.7094	0.00	0.6974	0.7240	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.7461	0.00	0.7322	0.7556	0.00	1.0000
Crowley ship	0.6627	0.01	0.6476	0.7291	0.00	5.0000
Crowley ship increased	5.0454	0.01	4.9770	5.0908	0.00	9.0000
Crowley truck loader	0.7001	0.00	0.6911	0.7110	0.00	1.0000
Crowley unloader	0.7012	0.00	0.6893	0.7125	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3932	0.00	0.3899	0.3983	0.00	2.0000
TB barge increased	2.6325	0.00	2.6253	2.6419	0.00	3.0000
TB loader	0.3606	0.00	0.3474	0.3689	0.00	1.0000
TB truck loader	0.3359	0.00	0.3295	0.3463	0.00	1.0000
TB unloader	0.3288	0.00	0.3166	0.3345	0.00	1.0000
TOTE loader	0.7453	0.00	0.7334	0.7552	0.00	1.0000
TOTE Ship	0.1192	0.00	0.1151	0.1231	0.00	2.0000
TOTE Ship increased	0.9249	0.00	0.9178	0.9368	0.00	2.0000
TOTE truck loader	0.7104	0.00	0.7019	0.7243	0.00	1.0000
TOTE unloader	0.7094	0.00	0.6974	0.7240	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

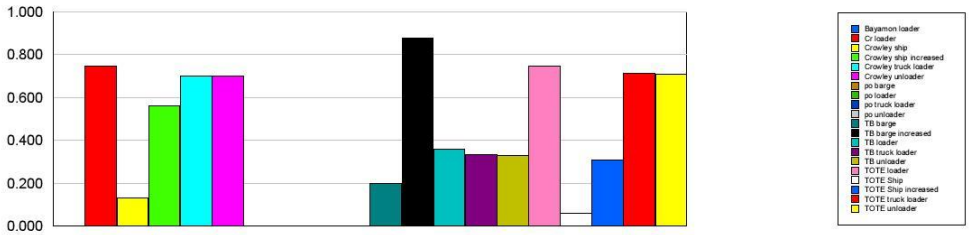
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	0.7461	0.00	0.7322	0.7556
Crowley ship	0.1325	0.00	0.1295	0.1458
Crowley ship increased	0.5606	0.00	0.5530	0.5656
Crowley truck loader	0.7001	0.00	0.6911	0.7110
Crowley unloader	0.7012	0.00	0.6893	0.7125
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1966	0.00	0.1950	0.1991
TB barge increased	0.8775	0.00	0.8751	0.8806
TB loader	0.3606	0.00	0.3474	0.3689
TB truck loader	0.3359	0.00	0.3295	0.3463
TB unloader	0.3288	0.00	0.3166	0.3345
TOTE loader	0.7453	0.00	0.7334	0.7552
TOTE Ship	0.05960043	0.00	0.05753011	0.06157240
TOTE Ship increased	0.3083	0.00	0.3059	0.3123
TOTE truck loader	0.7104	0.00	0.7019	0.7243
TOTE unloader	0.7094	0.00	0.6974	0.7240



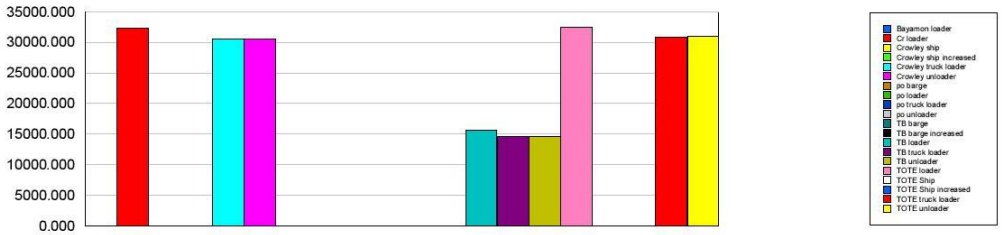
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	32367.56	16.92	32310.00	32447.00
Crowley ship	10.1200	0.14	10.0000	11.0000
Crowley ship increased	79.0800	0.24	78.0000	80.0000
Crowley truck loader	30522.92	26.85	30386.00	30600.00
Crowley unloader	30547.36	26.49	30396.00	30600.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	6.0000	0.00	6.0000	6.0000
TB barge increased	42.0000	0.00	42.0000	42.0000
TB loader	15696.84	13.61	15648.00	15771.00
TB truck loader	14624.64	0.74	14616.00	14625.00
TB unloader	14625.00	0.00	14625.00	14625.00
TOTE loader	32398.04	15.76	32283.00	32465.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	31.5600	0.21	31.0000	32.0000
TOTE truck loader	30873.24	32.16	30634.00	31017.00
TOTE unloader	30902.24	34.56	30642.00	31072.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	0.00	0.00	0.00	0.00	0.00	0.00
Crowley Deliverable	325.02	17.03	232.27	387.03	0.00	1146.00
Crowley inventory	3544.24	31.74	3373.21	3651.48	0.00	7264.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	61.4429	0.61	59.5606	64.2589	0.00	624.00
TB inventory	2031.75	11.24	1988.41	2092.48	0.00	3021.00
TOTE Deliverable	353.82	18.89	269.72	434.23	0.00	1306.00
TOTE inventory	2864.63	46.68	2393.15	3022.48	0.00	6376.00

3:15:40PM **Category Overview** January 14, 2019

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	76,259

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	139.18	0.14	138.57	139.88	122.49	492.28
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	134.39	0.10	133.99	134.92	122.96	146.09
TB freight	140.53	0.19	139.65	141.23	124.97	472.61
TOTE freight	68.7138	0.18	67.8675	69.8074	53.5287	425.10
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	180.15	3.73	156.72	193.46	14.9973	322.22
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	205.12	4.33	189.95	225.02	14.9871	288.69
TB freight	69.9533	0.47	68.0769	72.0643	12.5503	239.05
TOTE freight	94.2448	0.77	90.9290	96.8583	38.0449	272.33
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	319.33	3.67	296.60	332.43	143.59	559.34
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	339.52	4.36	324.45	359.76	146.37	421.04
TB freight	210.48	0.56	208.43	213.11	141.65	508.85
TOTE freight	162.96	0.71	159.25	165.32	95.5650	495.82
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

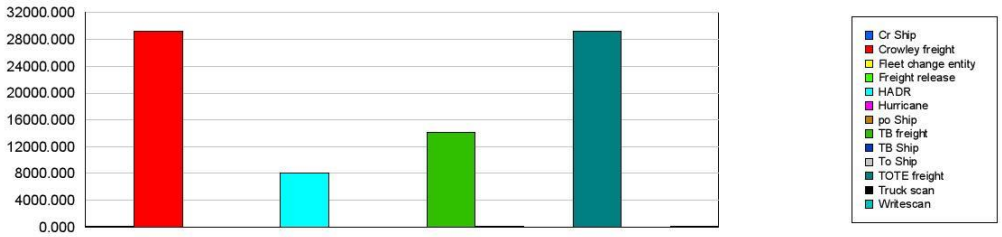
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	103.00	0.00	103.00	103.00
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	43.0000	0.00	43.0000	43.0000
To Ship	32.0000	0.00	32.0000	32.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	98.0800	0.11	98.0000	99.00
Crowley freight	27279.28	0.67	27278.00	27287.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	13000.00	0.00	13000.00	13000.00
TB Ship	40.0000	0.00	40.0000	40.0000
To Ship	31.0000	0.00	31.0000	31.0000
TOTE freight	27891.64	8.49	27806.00	27900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	6.7924	0.01	6.7360	6.8655	0.00	13.0000
Crowley freight	4396.39	49.57	4089.37	4573.67	0.00	8280.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	1347.46	17.30	1287.66	1427.80	0.00	3182.00
Hurricane	0.1071	0.00	0.1071	0.1071	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	1406.49	3.60	1393.24	1423.40	0.00	3740.00
TB Ship	3.3689	0.01	3.3317	3.4261	0.00	7.0000
To Ship	0.9810	0.00	0.9705	0.9942	0.00	4.0000
TOTE freight	2289.41	9.84	2238.23	2322.28	0.00	7275.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	1.4692	0.20	0.8636	3.5787	0.00	17.1976
Cr JAX PPT.Queue	81.3343	1.95	71.9854	90.9407	0.00	187.10
Cr road delay 1.Queue	75.9555	1.87	69.8879	88.5242	0.00004631	216.00
Cr road delay 2.Queue	11.8062	0.55	9.5379	14.8759	0.00214130	23.8823
Crowley avg TEU shipped.Queue	9.7324	0.01	9.6767	9.8053	0.00	30.9016
Crowley truck loading 2.Queue	0.1847	0.00	0.1739	0.1931	0.00	1.7308
Crowley truck loading.Queue	25.5557	3.15	13.6887	40.0423	0.00	92.8469
Crowley unload.Queue	60.2367	2.98	49.5867	74.2143	0.00	113.86
Crowley water delay.Queue	52.0639	1.04	45.6640	55.6413	29.9036	71.8232
TB avg TEU shipped.Queue	23.0502	0.01	23.0162	23.0767	0.00	54.7729
TB JAX PPT.Queue	0.1492	0.00	0.1443	0.1527	0.00	1.2616
TB road delay.Queue	61.7174	1.13	58.1460	67.4308	0.00217969	216.00
TB truck loading.Queue	0.7222	0.03	0.6011	0.8270	0.00	6.2602
TB unload.Queue	7.5768	0.06	7.3318	7.8877	0.00	31.3277
TB water delay.Queue	56.0158	0.89	51.0043	58.8604	51.0043	58.8604
TOTE avg TEU shipped.Queue	30.7310	0.04	30.5167	30.8975	0.00	75.3850
TOTE JAX PPT.Queue	2.4801	0.38	0.8016	3.9483	0.00	21.1041
TOTE road delay.Queue	74.0669	1.05	67.8053	78.4320	0.00328397	216.00
TOTE truck loading.Queue	9.0745	0.52	5.9342	11.8490	0.00	52.1269
TOTE unload.Queue	42.3015	0.61	40.0862	45.8966	0.00	121.00
TOTE water delay.Queue	43.8660	1.08	38.3446	48.3851	14.1064	71.2841
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	25.2696	1.34	21.6362	34.3420	0.00	105.92
transit to TB.Queue	53.3500	0.61	50.9224	56.1647	0.00	140.96
transit to TB_increased fleet.Queue	25.5951	0.39	24.1774	27.7670	0.00	114.90
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	5.2858	0.74	3.0921	12.8734	0.00	178.00
Cr JAX PPT.Queue	1500.29	36.00	1327.80	1677.67	0.00	4137.00
Cr road delay 1.Queue	97.2551	4.81	81.5856	134.37	0.00	3060.00
Cr road delay 2.Queue	0.7312	0.07	0.3985	1.1722	0.00	174.00
Crowley avg TEU shipped.Queue	179.24	0.24	178.22	180.59	0.00	360.00
Crowley truck loading 2.Queue	0.6642	0.01	0.6165	0.7000	0.00	27.0000
Crowley truck loading.Queue	355.33	43.75	191.25	556.26	0.00	1277.00
Crowley unload.Queue	1054.17	52.11	867.77	1298.75	0.00	2427.00
Crowley water delay.Queue	0.07463874	0.00	0.04530159	0.08279959	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.33	0.05	160.10	160.52	0.00	325.00
TB JAX PPT.Queue	1.0426	0.01	1.0082	1.0672	0.00	12.0000
TB road delay.Queue	41.0075	1.12	37.7906	47.2570	0.00	1414.00
TB truck loading.Queue	4.6572	0.17	3.8759	5.3329	0.00	112.00
TB unload.Queue	48.8586	0.38	47.2782	50.8632	0.00	644.00
TB water delay.Queue	0.02778559	0.00	0.02529973	0.02919663	0.00	1.0000
TOTE avg TEU shipped.Queue	442.10	0.56	439.04	444.48	0.00	900.00
TOTE JAX PPT.Queue	35.9043	5.57	11.6054	57.1622	0.00	470.00
TOTE road delay.Queue	95.8067	2.61	84.3530	108.43	0.00	2794.00
TOTE truck loading.Queue	125.57	7.24	82.1245	163.98	0.00	1127.00
TOTE unload.Queue	585.42	8.50	554.76	635.18	0.00	2648.00
TOTE water delay.Queue	0.04351789	0.00	0.03804032	0.04800113	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1273	0.01	0.1073	0.1874	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.1323	0.00	0.1263	0.1393	0.00	3.0000
transit to TB_increased fleet.Queue	0.4824	0.01	0.4557	0.5234	0.00	3.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3849	0.00	0.3735	0.3968	0.00	1.0000
Cr loader	0.8547	0.00	0.8399	0.8652	0.00	1.0000
Crowley ship	0.1325	0.00	0.1302	0.1451	0.00	1.0000
Crowley ship increased	0.6587	0.00	0.6523	0.6612	0.00	1.0000
Crowley truck loader	0.8093	0.00	0.7995	0.8232	0.00	1.0000
Crowley unloader	0.8101	0.00	0.7977	0.8200	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1631	0.00	0.1598	0.1656	0.00	1.0000
TB barge increased	0.8001	0.00	0.7947	0.8037	0.00	1.0000
TB loader	0.3246	0.00	0.3167	0.3296	0.00	1.0000
TB truck loader	0.2993	0.00	0.2945	0.3034	0.00	1.0000
TB unloader	0.2916	0.00	0.2846	0.3001	0.00	1.0000
TOTE loader	0.6704	0.00	0.6600	0.6792	0.00	1.0000
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092	0.00	1.0000
TOTE Ship increased	0.2727	0.00	0.2692	0.2762	0.00	0.6667
TOTE truck loader	0.6418	0.00	0.6236	0.6524	0.00	1.0000
TOTE unloader	0.6430	0.00	0.6323	0.6518	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3849	0.00	0.3735	0.3968	0.00	1.0000
Cr loader	0.8547	0.00	0.8399	0.8652	0.00	1.0000
Crowley ship	0.6625	0.01	0.6510	0.7254	0.00	5.0000
Crowley ship increased	5.9279	0.01	5.8703	5.9511	0.00	9.0000
Crowley truck loader	0.8093	0.00	0.7995	0.8232	0.00	1.0000
Crowley unloader	0.8101	0.00	0.7977	0.8200	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3261	0.00	0.3197	0.3312	0.00	2.0000
TB barge increased	2.4002	0.00	2.3842	2.4112	0.00	3.0000
TB loader	0.3246	0.00	0.3167	0.3296	0.00	1.0000
TB truck loader	0.2993	0.00	0.2945	0.3034	0.00	1.0000
TB unloader	0.2916	0.00	0.2846	0.3001	0.00	1.0000
TOTE loader	0.6704	0.00	0.6600	0.6792	0.00	1.0000
TOTE Ship	0.1193	0.00	0.1162	0.1240	0.00	2.0000
TOTE Ship increased	0.8182	0.00	0.8077	0.8285	0.00	2.0000
TOTE truck loader	0.6418	0.00	0.6236	0.6524	0.00	1.0000
TOTE unloader	0.6430	0.00	0.6323	0.6518	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

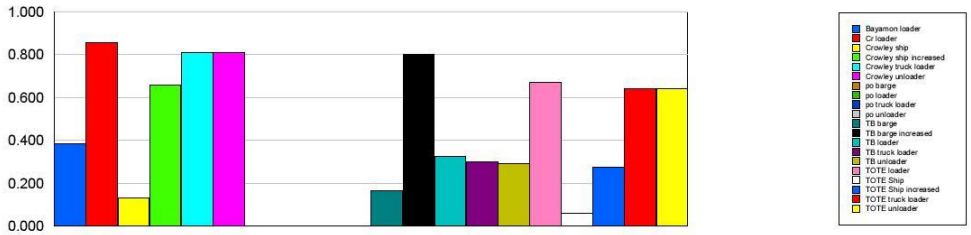
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.3849	0.00	0.3735	0.3968
Cr loader	0.8547	0.00	0.8399	0.8652
Crowley ship	0.1325	0.00	0.1302	0.1451
Crowley ship increased	0.6587	0.00	0.6523	0.6612
Crowley truck loader	0.8093	0.00	0.7995	0.8232
Crowley unloader	0.8101	0.00	0.7977	0.8200
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1631	0.00	0.1598	0.1656
TB barge increased	0.8001	0.00	0.7947	0.8037
TB loader	0.3246	0.00	0.3167	0.3296
TB truck loader	0.2993	0.00	0.2945	0.3034
TB unloader	0.2916	0.00	0.2846	0.3001
TOTE loader	0.6704	0.00	0.6600	0.6792
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092
TOTE Ship increased	0.2727	0.00	0.2692	0.2762
TOTE truck loader	0.6418	0.00	0.6236	0.6524
TOTE unloader	0.6430	0.00	0.6323	0.6518



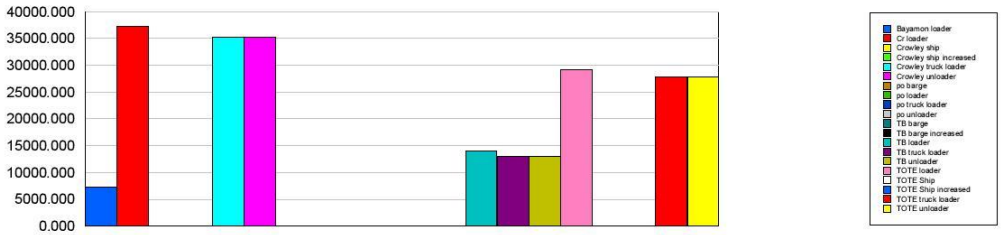
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	7250.52	26.99	7135.00	7413.00
Cr loader	37187.08	0.52	37186.00	37191.00
Crowley ship	10.1200	0.14	10.0000	11.0000
Crowley ship increased	92.8800	0.14	92.0000	93.0000
Crowley truck loader	35280.92	1.81	35280.00	35302.00
Crowley unloader	35281.00	1.90	35280.00	35303.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	5.0000	0.00	5.0000	5.0000
TB barge increased	38.0000	0.00	38.0000	38.0000
TB loader	14089.44	0.32	14089.00	14091.00
TB truck loader	13000.00	0.00	13000.00	13000.00
TB unloader	13000.00	0.00	13000.00	13000.00
TOTE loader	29185.64	0.31	29185.00	29187.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	28.0000	0.00	28.0000	28.0000
TOTE truck loader	27896.20	5.80	27831.00	27900.00
TOTE unloader	27898.56	2.97	27864.00	27900.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	5.6706	0.74	3.4656	13.2703	0.00	179.00
Crowley Deliverable	432.43	43.53	269.73	635.32	0.00	1278.00
Crowley inventory	5613.06	62.53	5215.32	5822.21	0.00	9374.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	55.4542	0.46	53.6299	58.3023	0.00	603.00
TB inventory	1361.19	3.18	1349.92	1379.36	0.00	2569.00
TOTE Deliverable	226.62	7.30	183.74	266.04	0.00	1128.00
TOTE inventory	2174.27	10.60	2126.70	2213.55	0.00	4884.00

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	76,258

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	151.39	0.35	150.08	153.42	122.20	501.31
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	134.29	0.10	133.89	134.64	122.67	144.77
TB freight	158.19	0.20	157.21	158.93	125.20	496.65
TOTE freight	84.9835	0.34	83.1572	86.8937	52.2359	428.75
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	267.98	4.72	243.48	290.53	14.9973	486.63
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	201.43	4.55	180.79	218.96	14.9871	290.44
TB freight	68.6345	0.39	66.9883	70.5878	12.0518	222.25
TOTE freight	127.50	1.12	123.29	134.06	37.7265	293.61
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	419.37	4.56	396.70	441.33	143.93	704.06
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	335.72	4.53	315.19	352.86	146.37	422.35
TB freight	226.83	0.49	224.79	229.29	142.42	592.71
TOTE freight	212.48	1.11	208.08	219.25	95.9050	655.51
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

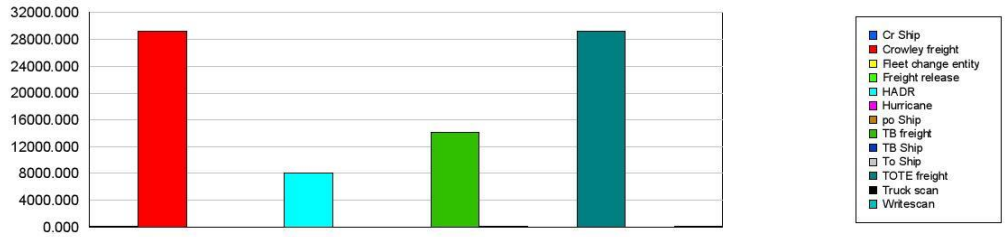
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	103.00	0.00	103.00	103.00
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	43.0000	0.00	43.0000	43.0000
To Ship	32.0000	0.00	32.0000	32.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	98.0000	0.00	98.0000	98.0000
Crowley freight	27278.72	0.35	27276.00	27279.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	13001.80	3.72	13000.00	13045.00
TB Ship	40.0400	0.08	40.0000	41.0000
To Ship	31.0000	0.00	31.0000	31.0000
TOTE freight	27889.84	5.64	27844.00	27900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	6.7889	0.01	6.7559	6.8618	0.00	13.0000
Crowley freight	5750.09	61.65	5442.99	6047.25	0.00	9020.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	1332.39	17.99	1250.93	1400.41	0.00	3224.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	1511.93	3.16	1498.77	1527.74	0.00	3595.00
TB Ship	3.3659	0.01	3.3330	3.4021	0.00	7.0000
To Ship	0.9814	0.00	0.9694	1.0056	0.00	4.0000
TOTE freight	2974.46	15.35	2914.07	3068.29	0.00	7236.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	1.1672	0.11	0.8753	2.0223	0.00	14.8580
Cr JAX PPT.Queue	83.3619	2.81	71.4603	104.05	0.00	217.66
Cr road delay 1.Queue	39.8702	2.59	22.7079	50.6509	0.00689457	120.00
Crowley avg TEU shipped.Queue	9.7425	0.01	9.6958	9.8214	0.00	30.9016
Crowley truck loading 2.Queue	0.1828	0.00	0.1696	0.1987	0.00	1.6194
Crowley truck loading.Queue	112.73	3.97	98.6743	135.74	0.00	241.86
Crowley unload.Queue	61.0425	3.10	49.7038	76.3811	0.00	117.71
Crowley water delay.Queue	52.0639	1.04	45.6640	55.6413	29.9036	71.8232
TB avg TEU shipped.Queue	23.0498	0.01	23.0075	23.0839	0.00	54.5559
TB JAX PPT.Queue	0.1490	0.00	0.1445	0.1535	0.00	1.2625
TB road delay.Queue	35.9650	6.21	17.6332	72.0690	0.00613786	120.00
TB truck loading.Queue	5.7340	0.17	5.0237	6.5604	0.00	62.2025
TB unload.Queue	7.6040	0.05	7.3627	7.8274	0.00	30.2831
TB water delay.Queue	56.0158	0.89	51.0043	58.8604	51.0043	58.8604
TOTE avg TEU shipped.Queue	30.7627	0.03	30.5802	30.9259	0.00	75.2752
TOTE JAX PPT.Queue	2.6125	0.37	1.3417	4.7925	0.00	22.5778
TOTE road delay.Queue	50.2426	3.27	37.8315	72.1729	0.02723577	120.00
TOTE truck loading.Queue	48.9186	0.97	45.3461	55.2185	0.00	179.65
TOTE unload.Queue	41.9247	0.61	39.2021	45.2893	0.00	124.88
TOTE water delay.Queue	43.8660	1.08	38.3446	48.3851	14.1064	71.2841
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	25.2696	1.34	21.6362	34.3420	0.00	105.92
transit to TB.Queue	53.3500	0.61	50.9224	56.1647	0.00	140.96
transit to TB_increased fleet.Queue	25.3240	0.36	23.5121	27.0351	0.00	112.27
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	4.1993	0.38	3.1486	7.2324	0.00	124.00
Cr JAX PPT.Queue	1537.66	51.76	1318.15	1919.36	0.00	4595.00
Cr road delay 1.Queue	9.4756	1.26	4.5055	17.6423	0.00	708.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	179.43	0.21	178.57	180.88	0.00	360.00
Crowley truck loading 2.Queue	0.6580	0.01	0.6100	0.7197	0.00	28.0000
Crowley truck loading.Queue	1567.13	55.03	1377.67	1889.02	0.00	3244.00
Crowley unload.Queue	1068.24	54.20	869.82	1336.67	0.00	2496.00
Crowley water delay.Queue	0.07463874	0.00	0.04530159	0.08279959	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.33	0.06	160.04	160.57	0.00	325.00
TB JAX PPT.Queue	1.0414	0.01	1.0096	1.0726	0.00	15.0000
TB road delay.Queue	1.6796	0.47	0.4723	5.1478	0.00	144.00
TB truck loading.Queue	36.9811	1.10	32.3947	42.3040	0.00	1313.00
TB unload.Queue	49.0600	0.33	47.4778	50.9679	0.00	643.00
TB water delay.Queue	0.02778559	0.00	0.02529973	0.02919663	0.00	1.0000
TOTE avg TEU shipped.Queue	442.55	0.44	439.94	444.89	0.00	900.00
TOTE JAX PPT.Queue	37.8213	5.39	19.4240	69.3796	0.00	497.00
TOTE road delay.Queue	7.1904	0.78	4.0075	11.8140	0.00	351.00
TOTE truck loading.Queue	676.98	13.42	627.56	764.18	0.00	3798.00
TOTE unload.Queue	580.21	8.47	542.53	626.77	0.00	2633.00
TOTE water delay.Queue	0.04351789	0.00	0.03804032	0.04800113	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1273	0.01	0.1073	0.1874	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.1323	0.00	0.1263	0.1393	0.00	3.0000
transit to TB_increased fleet.Queue	0.4773	0.01	0.4432	0.5096	0.00	3.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3856	0.00	0.3650	0.3984	0.00	1.0000
Cr loader	0.8553	0.00	0.8442	0.8671	0.00	1.0000
Crowley ship	0.1324	0.00	0.1297	0.1444	0.00	1.0000
Crowley ship increased	0.6583	0.00	0.6499	0.6611	0.00	1.0000
Crowley truck loader	0.8095	0.00	0.7989	0.8252	0.00	1.0000
Crowley unloader	0.8124	0.00	0.8040	0.8195	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1636	0.00	0.1602	0.1662	0.00	1.0000
TB barge increased	0.8005	0.00	0.7966	0.8044	0.00	1.0000
TB loader	0.3243	0.00	0.3160	0.3329	0.00	1.0000
TB truck loader	0.2987	0.00	0.2919	0.3044	0.00	1.0000
TB unloader	0.2911	0.00	0.2861	0.2987	0.00	1.0000
TOTE loader	0.6699	0.00	0.6622	0.6784	0.00	1.0000
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092	0.00	1.0000
TOTE Ship increased	0.2728	0.00	0.2691	0.2795	0.00	0.6667
TOTE truck loader	0.6432	0.00	0.6305	0.6522	0.00	1.0000
TOTE unloader	0.6419	0.00	0.6313	0.6512	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3856	0.00	0.3650	0.3984	0.00	1.0000
Cr loader	0.8553	0.00	0.8442	0.8671	0.00	1.0000
Crowley ship	0.6619	0.01	0.6487	0.7220	0.00	5.0000
Crowley ship increased	5.9250	0.01	5.8487	5.9496	0.00	9.0000
Crowley truck loader	0.8095	0.00	0.7989	0.8252	0.00	1.0000
Crowley unloader	0.8124	0.00	0.8040	0.8195	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3271	0.00	0.3205	0.3325	0.00	2.0000
TB barge increased	2.4014	0.00	2.3897	2.4131	0.00	3.0000
TB loader	0.3243	0.00	0.3160	0.3329	0.00	1.0000
TB truck loader	0.2987	0.00	0.2919	0.3044	0.00	1.0000
TB unloader	0.2911	0.00	0.2861	0.2987	0.00	1.0000
TOTE loader	0.6699	0.00	0.6622	0.6784	0.00	1.0000
TOTE Ship	0.1193	0.00	0.1162	0.1240	0.00	2.0000
TOTE Ship increased	0.8185	0.00	0.8072	0.8386	0.00	2.0000
TOTE truck loader	0.6432	0.00	0.6305	0.6522	0.00	1.0000
TOTE unloader	0.6419	0.00	0.6313	0.6512	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

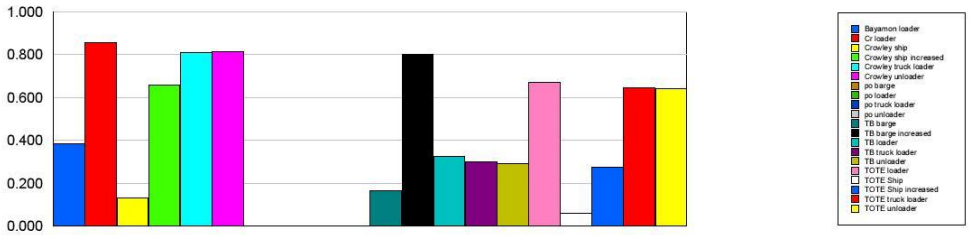
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.3856	0.00	0.3650	0.3984
Cr loader	0.8553	0.00	0.8442	0.8671
Crowley ship	0.1324	0.00	0.1297	0.1444
Crowley ship increased	0.6583	0.00	0.6499	0.6611
Crowley truck loader	0.8095	0.00	0.7989	0.8252
Crowley unloader	0.8124	0.00	0.8040	0.8195
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1636	0.00	0.1602	0.1662
TB barge increased	0.8005	0.00	0.7966	0.8044
TB loader	0.3243	0.00	0.3160	0.3329
TB truck loader	0.2987	0.00	0.2919	0.3044
TB unloader	0.2911	0.00	0.2861	0.2987
TOTE loader	0.6699	0.00	0.6622	0.6784
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092
TOTE Ship increased	0.2728	0.00	0.2691	0.2795
TOTE truck loader	0.6432	0.00	0.6305	0.6522
TOTE unloader	0.6419	0.00	0.6313	0.6512



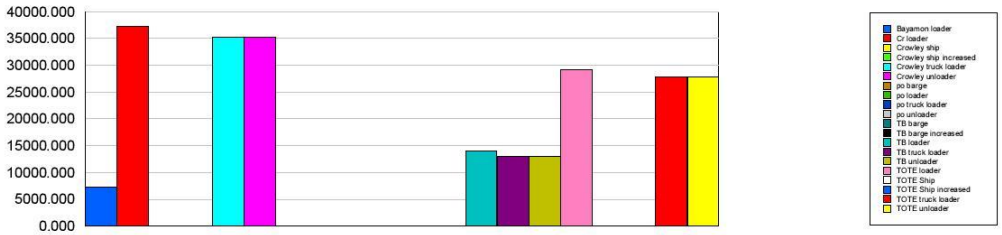
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	7254.72	28.70	7111.00	7389.00
Cr loader	37186.36	0.47	37183.00	37190.00
Crowley ship	10.1200	0.14	10.0000	11.0000
Crowley ship increased	92.8800	0.14	92.0000	93.0000
Crowley truck loader	35280.00	0.00	35280.00	35280.00
Crowley unloader	35280.00	0.00	35280.00	35280.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	5.0000	0.00	5.0000	5.0000
TB barge increased	38.0000	0.00	38.0000	38.0000
TB loader	14090.32	0.74	14089.00	14094.00
TB truck loader	13002.24	4.62	13000.00	13056.00
TB unloader	13002.28	4.71	13000.00	13057.00
TOTE loader	29186.16	0.65	29185.00	29190.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	28.0000	0.00	28.0000	28.0000
TOTE truck loader	27899.20	1.65	27880.00	27900.00
TOTE unloader	27900.00	0.00	27900.00	27900.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	4.5849	0.38	3.5291	7.6308	0.00	125.00
Crowley Deliverable	1810.34	55.30	1615.99	2131.64	0.00	3245.00
Crowley inventory	7041.35	73.37	6651.99	7406.31	0.00	11470.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	200.97	1.68	194.79	209.57	0.00	1843.00
TB inventory	1505.95	3.01	1492.92	1520.69	0.00	3588.00
TOTE Deliverable	1002.82	14.19	946.96	1091.70	0.00	3799.00
TOTE inventory	2947.95	15.34	2889.29	3042.77	0.00	7221.00

2:33:07PM **Category Overview** January 14, 2019

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	76,260

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	133.98	0.10	133.47	134.63	124.78	230.64
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	134.35	0.12	133.59	135.13	125.44	145.62
TB freight	133.42	0.15	132.62	134.05	124.91	228.04
TOTE freight	62.1726	0.19	61.3772	63.5379	52.1312	208.11
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	160.42	2.81	146.76	174.25	14.9520	292.79
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	200.10	4.07	181.02	219.63	14.9871	283.79
TB freight	64.9282	0.36	63.5446	66.4644	11.3123	174.06
TOTE freight	83.1479	0.51	80.5504	84.8019	40.0334	176.33
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	294.41	2.77	281.19	308.11	143.14	440.63
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	334.44	4.07	315.10	354.00	146.37	417.11
TB freight	198.35	0.46	196.45	200.26	142.03	377.65
TOTE freight	145.32	0.55	142.77	147.30	95.7422	321.93
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

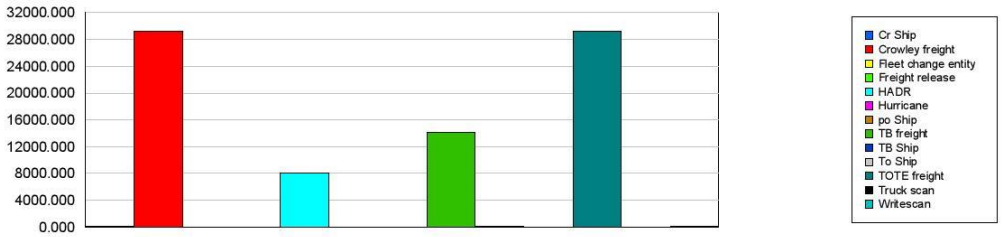
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	103.00	0.00	103.00	103.00
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	43.0000	0.00	43.0000	43.0000
To Ship	32.0000	0.00	32.0000	32.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	98.0400	0.08	98.0000	99.00
Crowley freight	27279.04	0.08	27279.00	27280.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	0.00	0.00	0.00	0.00
TB freight	13000.00	0.00	13000.00	13000.00
TB Ship	40.0000	0.00	40.0000	40.0000
To Ship	31.0000	0.00	31.0000	31.0000
TOTE freight	27893.00	5.76	27839.00	27900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	6.7893	0.01	6.7513	6.8577	0.00	13.0000
Crowley freight	4059.21	37.55	3880.30	4244.59	0.00	6948.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	1327.32	16.17	1250.55	1404.92	0.00	3094.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	1328.26	2.95	1315.99	1340.59	0.00	2780.00
TB Ship	3.3702	0.01	3.3345	3.4076	0.00	7.0000
To Ship	0.9827	0.00	0.9712	1.0037	0.00	4.0000
TOTE freight	2045.40	7.56	2010.20	2072.84	0.00	5163.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	1.1587	0.10	0.8207	1.6335	0.00	11.5823
Cr JAX PPT.Queue	81.5645	2.65	72.6931	101.15	0.00	200.61
Cr road delay 1.Queue	36.5772	2.90	22.9011	53.9021	0.00005476	120.00
Crowley avg TEU shipped.Queue	9.7546	0.01	9.6923	9.7929	0.00	30.9016
Crowley truck loading 2.Queue	0.1803	0.00	0.1738	0.1903	0.00	1.5424
Crowley truck loading.Queue	8.7906	1.93	4.7114	20.5725	0.00	54.8382
Crowley unload.Queue	61.3717	3.42	44.4981	76.8245	0.00	123.90
Crowley water delay.Queue	52.0639	1.04	45.6640	55.6413	29.9036	71.8232
TB avg TEU shipped.Queue	23.0503	0.01	23.0035	23.1068	0.00	54.6382
TB JAX PPT.Queue	0.1493	0.00	0.1450	0.1552	0.00	1.3767
TB road delay.Queue	36.6088	4.14	25.1633	54.2999	0.00038192	120.00
TB truck loading.Queue	0.8385	0.03	0.7387	0.9966	0.00	5.4688
TB unload.Queue	7.6080	0.05	7.3805	7.8787	0.00	30.5726
TB water delay.Queue	56.0158	0.89	51.0043	58.8604	51.0043	58.8604
TOTE avg TEU shipped.Queue	30.7578	0.03	30.6241	30.9216	0.00	75.1629
TOTE JAX PPT.Queue	2.5418	0.34	0.9096	3.9263	0.00	20.7759
TOTE road delay.Queue	41.8366	1.47	31.3514	47.7369	0.00839524	120.00
TOTE truck loading.Queue	2.8434	0.38	1.6093	5.0428	0.00	22.2796
TOTE unload.Queue	42.4816	0.72	37.8255	45.2153	0.00	126.60
TOTE water delay.Queue	43.8660	1.08	38.3446	48.3851	14.1064	71.2841
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	25.2696	1.34	21.6362	34.3420	0.00	105.92
transit to TB.Queue	53.3500	0.61	50.9224	56.1647	0.00	140.96
transit to TB_increased fleet.Queue	25.6015	0.35	24.3942	27.0264	0.00	108.39
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	4.1706	0.36	2.9585	5.9175	0.00	95.0000
Cr JAX PPT.Queue	1504.53	48.87	1340.78	1865.78	0.00	4258.00
Cr road delay 1.Queue	20.8978	2.76	10.6667	40.0256	0.00	1497.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	179.65	0.19	178.51	180.35	0.00	360.00
Crowley truck loading 2.Queue	0.6485	0.01	0.6174	0.6861	0.00	28.0000
Crowley truck loading.Queue	122.22	26.84	65.5013	286.16	0.00	748.00
Crowley unload.Queue	1074.01	59.83	778.72	1344.43	0.00	2612.00
Crowley water delay.Queue	0.07463874	0.00	0.04530159	0.08279959	0.00	3.0000
po avg TEU shipped.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po JAX PPT.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po road delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po truck loading.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po unload.Queue	0.00	0.00	0.00	0.00	0.00	0.00
po water delay.Queue	0.00	0.00	0.00	0.00	0.00	0.00
TB avg TEU shipped.Queue	160.33	0.07	160.01	160.72	0.00	325.00
TB JAX PPT.Queue	1.0435	0.01	1.0135	1.0847	0.00	14.0000
TB road delay.Queue	7.6151	0.72	5.9902	11.5878	0.00	522.00
TB truck loading.Queue	5.4072	0.19	4.7632	6.4267	0.00	130.00
TB unload.Queue	49.0592	0.31	47.5923	50.8048	0.00	646.00
TB water delay.Queue	0.02778559	0.00	0.02529973	0.02919663	0.00	1.0000
TOTE avg TEU shipped.Queue	442.48	0.47	440.57	444.82	0.00	900.00
TOTE JAX PPT.Queue	36.7989	4.99	13.1679	56.8452	0.00	458.00
TOTE road delay.Queue	24.7613	1.35	16.7643	31.3052	0.00	1339.00
TOTE truck loading.Queue	39.3480	5.30	22.2718	69.7885	0.00	452.00
TOTE unload.Queue	587.91	9.93	523.48	625.75	0.00	2671.00
TOTE water delay.Queue	0.04351789	0.00	0.03804032	0.04800113	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1273	0.01	0.1073	0.1874	0.00	4.0000
transit to po.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TB.Queue	0.1323	0.00	0.1263	0.1393	0.00	3.0000
transit to TB_increased fleet.Queue	0.4826	0.01	0.4598	0.5094	0.00	3.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3854	0.00	0.3726	0.3969	0.00	1.0000
Cr loader	0.8544	0.00	0.8403	0.8674	0.00	1.0000
Crowley ship	0.1324	0.00	0.1296	0.1446	0.00	1.0000
Crowley ship increased	0.6584	0.00	0.6516	0.6622	0.00	1.0000
Crowley truck loader	0.8110	0.00	0.8014	0.8218	0.00	1.0000
Crowley unloader	0.8105	0.00	0.7985	0.8195	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.1634	0.00	0.1609	0.1661	0.00	1.0000
TB barge increased	0.8002	0.00	0.7966	0.8043	0.00	1.0000
TB loader	0.3243	0.00	0.3170	0.3327	0.00	1.0000
TB truck loader	0.2985	0.00	0.2911	0.3040	0.00	1.0000
TB unloader	0.2906	0.00	0.2860	0.2968	0.00	1.0000
TOTE loader	0.6702	0.00	0.6611	0.6796	0.00	1.0000
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092	0.00	1.0000
TOTE Ship increased	0.2733	0.00	0.2697	0.2807	0.00	0.6667
TOTE truck loader	0.6428	0.00	0.6313	0.6498	0.00	1.0000
TOTE unloader	0.6420	0.00	0.6352	0.6548	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.3854	0.00	0.3726	0.3969	0.00	1.0000
Cr loader	0.8544	0.00	0.8403	0.8674	0.00	1.0000
Crowley ship	0.6618	0.01	0.6481	0.7232	0.00	5.0000
Crowley ship increased	5.9256	0.01	5.8647	5.9602	0.00	9.0000
Crowley truck loader	0.8110	0.00	0.8014	0.8218	0.00	1.0000
Crowley unloader	0.8105	0.00	0.7985	0.8195	0.00	1.0000
po barge	0.00	0.00	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00	0.00	0.00
TB barge	0.3268	0.00	0.3218	0.3321	0.00	2.0000
TB barge increased	2.4007	0.00	2.3898	2.4128	0.00	3.0000
TB loader	0.3243	0.00	0.3170	0.3327	0.00	1.0000
TB truck loader	0.2985	0.00	0.2911	0.3040	0.00	1.0000
TB unloader	0.2906	0.00	0.2860	0.2968	0.00	1.0000
TOTE loader	0.6702	0.00	0.6611	0.6796	0.00	1.0000
TOTE Ship	0.1193	0.00	0.1162	0.1240	0.00	2.0000
TOTE Ship increased	0.8199	0.00	0.8090	0.8420	0.00	2.0000
TOTE truck loader	0.6428	0.00	0.6313	0.6498	0.00	1.0000
TOTE unloader	0.6420	0.00	0.6352	0.6548	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

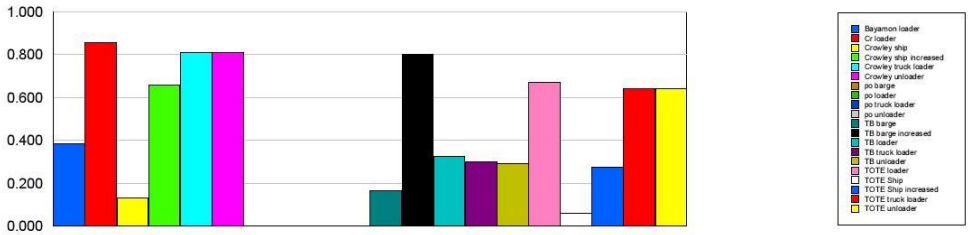
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.3854	0.00	0.3726	0.3969
Cr loader	0.8544	0.00	0.8403	0.8674
Crowley ship	0.1324	0.00	0.1296	0.1446
Crowley ship increased	0.6584	0.00	0.6516	0.6622
Crowley truck loader	0.8110	0.00	0.8014	0.8218
Crowley unloader	0.8105	0.00	0.7985	0.8195
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	0.1634	0.00	0.1609	0.1661
TB barge increased	0.8002	0.00	0.7966	0.8043
TB loader	0.3243	0.00	0.3170	0.3327
TB truck loader	0.2985	0.00	0.2911	0.3040
TB unloader	0.2906	0.00	0.2860	0.2968
TOTE loader	0.6702	0.00	0.6611	0.6796
TOTE Ship	0.05966732	0.00	0.05807822	0.06202092
TOTE Ship increased	0.2733	0.00	0.2697	0.2807
TOTE truck loader	0.6428	0.00	0.6313	0.6498
TOTE unloader	0.6420	0.00	0.6352	0.6548



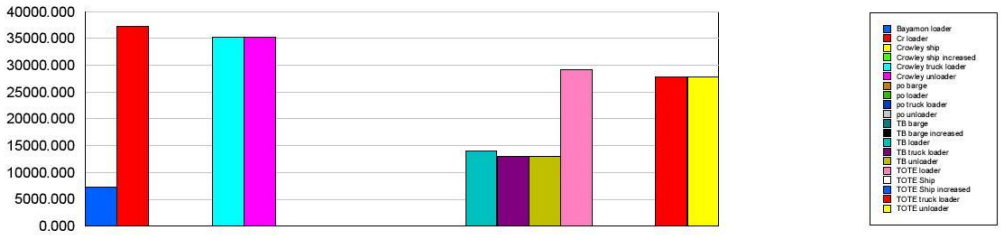
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	7251.04	26.15	7134.00	7424.00
Cr loader	37186.88	0.66	37184.00	37191.00
Crowley ship	10.1200	0.14	10.0000	11.0000
Crowley ship increased	92.8800	0.14	92.0000	93.0000
Crowley truck loader	35280.16	0.33	35280.00	35284.00
Crowley unloader	35280.20	0.41	35280.00	35285.00
po barge	0.00	0.00	0.00	0.00
po loader	0.00	0.00	0.00	0.00
po truck loader	0.00	0.00	0.00	0.00
po unloader	0.00	0.00	0.00	0.00
TB barge	5.0000	0.00	5.0000	5.0000
TB barge increased	38.0000	0.00	38.0000	38.0000
TB loader	14090.08	0.49	14089.00	14093.00
TB truck loader	13000.00	0.00	13000.00	13000.00
TB unloader	13000.00	0.00	13000.00	13000.00
TOTE loader	29186.04	0.55	29185.00	29190.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	28.0000	0.00	28.0000	28.0000
TOTE truck loader	27898.16	2.89	27867.00	27900.00
TOTE unloader	27899.20	1.65	27880.00	27900.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	4.5561	0.36	3.3330	6.3019	0.00	96.0000
Crowley Deliverable	129.96	26.87	73.0298	294.07	0.00	749.00
Crowley inventory	5333.98	51.92	5084.29	5595.81	0.00	8995.00
po Deliverable	0.00	0.00	0.00	0.00	0.00	0.00
po inventory	0.00	0.00	0.00	0.00	0.00	0.00
TB Deliverable	9.9781	0.21	9.1078	11.0752	0.00	157.00
TB inventory	1316.35	2.71	1305.11	1328.69	0.00	2399.00
TOTE Deliverable	48.3656	5.29	30.5286	78.6470	0.00	453.00
TOTE inventory	2001.32	7.94	1959.55	2028.51	0.00	4158.00

2:08:05PM **Category Overview** January 14, 2019

Values Across All Replications

Unnamed Project

Replications: 25 Time Units: Hours

Key Performance Indicators

System	Average
Number Out	73,920

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	140.95	0.15	140.39	141.76	124.20	495.49
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	133.97	0.34	132.76	135.94	124.75	145.05
TB freight	140.81	0.20	139.92	141.65	125.57	427.59
TOTE freight	68.7897	0.20	67.6391	69.7190	52.4831	423.37
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	62.2494	1.22	53.4196	66.2736	14.3128	178.82
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	538.68	5.64	510.79	564.64	81.1059	1095.84
TB freight	64.1818	0.55	62.0179	66.8572	11.8057	176.98
TOTE freight	87.7366	1.65	70.7176	92.2097	39.1793	176.83
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Entity

Time

Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	0.00	0.00	0.00	0.00	0.00	0.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	0.00	0.00	0.00	0.00	0.00	0.00
TB freight	0.00	0.00	0.00	0.00	0.00	0.00
TOTE freight	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Crowley freight	203.20	1.16	194.91	206.69	141.62	563.99
Fleet change entity	0.00	0.00	0.00	0.00	0.00	0.00
Freight release	0.00	0.00	0.00	0.00	0.00	0.00
HADR	672.65	5.75	646.73	699.78	210.81	1235.73
TB freight	204.99	0.67	202.35	208.17	140.51	508.44
TOTE freight	156.53	1.58	140.15	160.60	95.0804	502.12
Writescan	0.00	0.00	0.00	0.00	0.00	0.00

Other

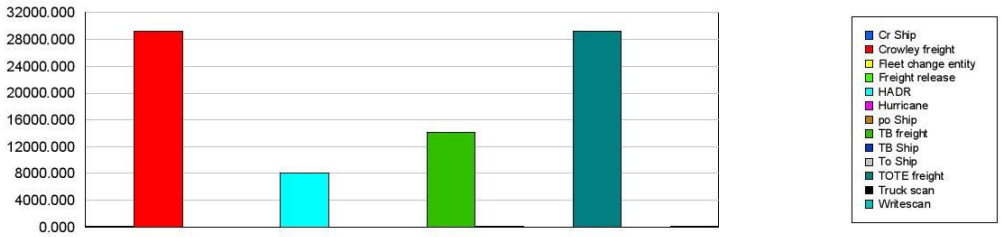
Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number In	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	81.0000	0.00	81.0000	81.0000
Crowley freight	29196.00	0.00	29196.00	29196.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	8001.00	0.00	8001.00	8001.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	20.0000	0.00	20.0000	20.0000
TB freight	14094.00	0.00	14094.00	14094.00
TB Ship	43.0000	0.00	43.0000	43.0000
To Ship	32.0000	0.00	32.0000	32.0000
TOTE freight	29196.00	0.00	29196.00	29196.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000



Unnamed Project

Replications: 25 Time Units: Hours

Entity

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Cr Ship	76.0000	0.00	76.0000	76.0000
Crowley freight	27338.28	12.47	27239.00	27360.00
Fleet change entity	1.0000	0.00	1.0000	1.0000
Freight release	1.0000	0.00	1.0000	1.0000
HADR	5600.00	0.00	5600.00	5600.00
Hurricane	1.0000	0.00	1.0000	1.0000
po Ship	14.0000	0.00	14.0000	14.0000
TB freight	13000.56	1.16	13000.00	13014.00
TB Ship	40.0400	0.08	40.0000	41.0000
To Ship	31.0000	0.00	31.0000	31.0000
TOTE freight	27893.84	3.76	27859.00	27900.00
Truck scan	0.00	0.00	0.00	0.00
Writescan	85.0000	0.00	85.0000	85.0000

WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr Ship	5.3256	0.01	5.2893	5.3512	0.00	13.0000
Crowley freight	2826.46	15.65	2714.24	2874.03	0.00	6091.00
Fleet change entity	0.00	0.00	0.00	0.00	0.00	1.0000
Freight release	0.00	0.00	0.00	0.00	0.00	1.0000
HADR	3086.65	25.17	2942.22	3206.61	0.00	5201.00
Hurricane	0.05952381	0.00	0.05952381	0.05952381	0.00	1.0000
po Ship	7.3277	0.07	6.9548	7.6427	0.00	13.0000
TB freight	1371.07	4.35	1354.01	1391.57	0.00	2808.00
TB Ship	3.3690	0.01	3.3192	3.4291	0.00	7.0000
To Ship	0.9795	0.00	0.9492	0.9944	0.00	4.0000
TOTE freight	2200.47	21.91	1973.38	2256.94	0.00	5171.00
Truck scan	0.00	0.00	0.00	0.00	0.00	0.00
Writescan	0.00	0.00	0.00	0.00	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Cr JAX PPT.Queue	2.8194	0.47	0.7715	6.7816	0.00	29.6286
Cr road delay 1.Queue	35.8378	2.47	25.4797	51.1846	0.00026371	120.00
Crowley avg TEU shipped.Queue	12.2678	0.01	12.2137	12.3330	0.00	31.2548
Crowley truck loading.Queue	10.3758	0.51	8.3539	12.9673	0.00	60.4372
Crowley unload.Queue	30.7271	1.29	22.8089	35.2481	0.00	101.16
Crowley water delay.Queue	50.6496	1.16	44.2358	55.7169	28.7467	71.9203
po avg TEU shipped.Queue	28.6510	0.40	26.8493	30.0203	0.00	82.6747
po JAX PPT.Queue	0.2353	0.00	0.2093	0.2504	0.00	1.9792
po road delay.Queue	38.0257	0.26	36.9708	39.0062	26.5081	48.0000
po truck loading.Queue	1.0463	0.07	0.6484	1.3688	0.00	5.3688
po unload.Queue	8.9455	0.07	8.6113	9.3272	0.00	22.2262
po water delay.Queue	51.8460	2.93	36.7201	63.5156	36.7201	63.5156
TB avg TEU shipped.Queue	23.0461	0.01	23.0166	23.0733	0.00	54.5344
TB JAX PPT.Queue	0.1488	0.00	0.1453	0.1531	0.00	1.2813
TB road delay.Queue	35.7503	4.12	24.7382	56.3989	0.00	119.99
TB truck loading.Queue	0.6969	0.03	0.5856	0.8513	0.00	5.0194
TB unload.Queue	7.6120	0.07	7.2164	7.8856	0.00	31.0125
TB water delay.Queue	54.9745	1.04	48.2133	59.4056	48.2133	59.4056
TOTE avg TEU shipped.Queue	30.7536	0.03	30.5991	30.8721	0.00	75.1515
TOTE JAX PPT.Queue	3.4335	0.60	0.7228	6.2012	0.00	28.6899
TOTE road delay.Queue	41.8411	1.97	35.1218	57.0843	0.00349435	120.00
TOTE truck loading.Queue	8.5513	0.57	6.1126	11.9204	0.00	53.4382
TOTE unload.Queue	41.2159	1.51	27.0863	45.0749	0.00	122.38
TOTE water delay.Queue	41.8083	1.64	28.1315	47.0602	14.5711	68.5581
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	23.8911	0.48	21.5126	25.8782	0.00	56.0752
transit to po.Queue	531.07	5.97	501.89	561.37	0.00	1117.70
transit to TB.Queue	54.1387	0.50	52.0489	57.3134	0.00	143.49
transit to TB_increased fleet.Queue	25.3427	0.51	23.3961	27.6458	0.00	114.48
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Unnamed Project

Replications: 25 Time Units: Hours

Queue

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon turnaround time.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Cr JAX PPT.Queue	40.8169	6.84	11.1694	98.1744	0.00	619.00
Cr road delay 1.Queue	12.5897	1.78	7.3178	27.3695	0.00	1078.00
Cr road delay 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley avg TEU shipped.Queue	177.46	0.16	176.68	178.40	0.00	360.00
Crowley truck loading 2.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Crowley truck loading.Queue	140.77	6.93	113.19	175.98	0.00	1224.00
Crowley unload.Queue	416.95	17.54	309.55	478.01	0.00	2128.00
Crowley water delay.Queue	0.07361363	0.00	0.04388468	0.08291208	0.00	3.0000
po avg TEU shipped.Queue	114.11	1.57	106.99	119.54	0.00	400.00
po JAX PPT.Queue	0.9338	0.02	0.8305	0.9938	0.00	43.0000
po road delay.Queue	7.5448	0.05	7.3355	7.7393	0.00	400.00
po truck loading.Queue	2.9064	0.20	1.8011	3.8023	0.00	115.00
po unload.Queue	24.8487	0.20	23.9204	25.9088	0.00	399.00
po water delay.Queue	0.02571726	0.00	0.01821435	0.03150576	0.00	1.0000
TB avg TEU shipped.Queue	160.30	0.04	160.10	160.49	0.00	325.00
TB JAX PPT.Queue	1.0403	0.01	1.0156	1.0701	0.00	15.0000
TB road delay.Queue	4.8408	0.77	3.0364	9.2879	0.00	362.00
TB truck loading.Queue	4.4942	0.19	3.7759	5.4896	0.00	113.00
TB unload.Queue	49.0996	0.45	46.5342	50.8497	0.00	648.00
TB water delay.Queue	0.02726908	0.00	0.02391530	0.02946708	0.00	1.0000
TOTE avg TEU shipped.Queue	442.42	0.40	440.22	444.12	0.00	900.00
TOTE JAX PPT.Queue	49.7071	8.65	10.4643	89.7732	0.00	591.00
TOTE road delay.Queue	16.2937	2.55	11.0801	43.2096	0.00	1526.00
TOTE truck loading.Queue	118.34	7.90	84.5775	164.97	0.00	1162.00
TOTE unload.Queue	570.40	20.85	374.86	623.80	0.00	2576.00
TOTE water delay.Queue	0.04091836	0.00	0.01395411	0.04668666	0.00	2.0000
transit to Cr_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to Crowley.Queue	0.1185	0.00	0.1067	0.1284	0.00	4.0000
transit to po.Queue	6.3419	0.07	5.9736	6.6719	0.00	12.0000
transit to TB.Queue	0.1343	0.00	0.1291	0.1421	0.00	3.0000
transit to TB_increased fleet.Queue	0.4777	0.01	0.4410	0.5211	0.00	3.0000
transit to TOTE.Queue	0.00	0.00	0.00	0.00	0.00	0.00
transit to TOTE_increased fleet.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.6699	0.00	0.6598	0.6767	0.00	1.0000
Crowley ship	0.1310	0.00	0.1297	0.1321	0.00	1.0000
Crowley ship increased	0.4976	0.00	0.4955	0.5002	0.00	1.0000
Crowley truck loader	0.6268	0.00	0.6193	0.6359	0.00	1.0000
Crowley unloader	0.6271	0.00	0.6187	0.6389	0.00	1.0000
po barge	0.9601	0.00	0.9520	0.9659	0.00	1.0000
po loader	0.1846	0.00	0.1807	0.1893	0.00	1.0000
po truck loader	0.1289	0.00	0.1244	0.1342	0.00	1.0000
po unloader	0.1248	0.00	0.1198	0.1295	0.00	1.0000
TB barge	0.1644	0.00	0.1608	0.1685	0.00	1.0000
TB barge increased	0.8003	0.00	0.7948	0.8061	0.00	1.0000
TB loader	0.3234	0.00	0.3170	0.3308	0.00	1.0000
TB truck loader	0.2986	0.00	0.2908	0.3036	0.00	1.0000
TB unloader	0.2921	0.00	0.2854	0.2979	0.00	1.0000
TOTE loader	0.6716	0.00	0.6587	0.6831	0.00	1.0000
TOTE Ship	0.05938804	0.00	0.05551374	0.06114966	0.00	1.0000
TOTE Ship increased	0.2733	0.00	0.2682	0.2769	0.00	0.6667
TOTE truck loader	0.6419	0.00	0.6340	0.6503	0.00	1.0000
TOTE unloader	0.6419	0.00	0.6255	0.6504	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Busy	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	0.00	0.00	0.00	0.00	0.00	0.00
Cr loader	0.6699	0.00	0.6598	0.6767	0.00	1.0000
Crowley ship	0.6548	0.00	0.6483	0.6604	0.00	5.0000
Crowley ship increased	4.4787	0.00	4.4599	4.5015	0.00	9.0000
Crowley truck loader	0.6268	0.00	0.6193	0.6359	0.00	1.0000
Crowley unloader	0.6271	0.00	0.6187	0.6389	0.00	1.0000
po barge	0.9601	0.00	0.9520	0.9659	0.00	1.0000
po loader	0.1846	0.00	0.1807	0.1893	0.00	1.0000
po truck loader	0.1289	0.00	0.1244	0.1342	0.00	1.0000
po unloader	0.1248	0.00	0.1198	0.1295	0.00	1.0000
TB barge	0.3289	0.00	0.3217	0.3371	0.00	2.0000
TB barge increased	2.4009	0.00	2.3845	2.4184	0.00	3.0000
TB loader	0.3234	0.00	0.3170	0.3308	0.00	1.0000
TB truck loader	0.2986	0.00	0.2908	0.3036	0.00	1.0000
TB unloader	0.2921	0.00	0.2854	0.2979	0.00	1.0000
TOTE loader	0.6716	0.00	0.6587	0.6831	0.00	1.0000
TOTE Ship	0.1188	0.00	0.1110	0.1223	0.00	2.0000
TOTE Ship increased	0.8198	0.00	0.8046	0.8308	0.00	2.0000
TOTE truck loader	0.6419	0.00	0.6340	0.6503	0.00	1.0000
TOTE unloader	0.6419	0.00	0.6255	0.6504	0.00	1.0000

Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Number Scheduled

	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Cr loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley ship	5.0000	0.00	5.0000	5.0000	5.0000	5.0000
Crowley ship increased	9.0000	0.00	9.0000	9.0000	9.0000	9.0000
Crowley truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
Crowley unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po barge	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
po unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB barge	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TB barge increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TB loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TB unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE Ship	2.0000	0.00	2.0000	2.0000	2.0000	2.0000
TOTE Ship increased	3.0000	0.00	3.0000	3.0000	3.0000	3.0000
TOTE truck loader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000
TOTE unloader	1.0000	0.00	1.0000	1.0000	1.0000	1.0000

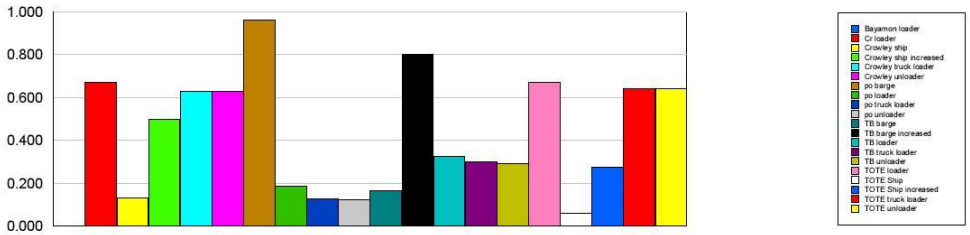
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	0.6699	0.00	0.6598	0.6767
Crowley ship	0.1310	0.00	0.1297	0.1321
Crowley ship increased	0.4976	0.00	0.4955	0.5002
Crowley truck loader	0.6268	0.00	0.6193	0.6359
Crowley unloader	0.6271	0.00	0.6187	0.6389
po barge	0.9601	0.00	0.9520	0.9659
po loader	0.1846	0.00	0.1807	0.1893
po truck loader	0.1289	0.00	0.1244	0.1342
po unloader	0.1248	0.00	0.1198	0.1295
TB barge	0.1644	0.00	0.1608	0.1685
TB barge increased	0.8003	0.00	0.7948	0.8061
TB loader	0.3234	0.00	0.3170	0.3308
TB truck loader	0.2986	0.00	0.2908	0.3036
TB unloader	0.2921	0.00	0.2854	0.2979
TOTE loader	0.6716	0.00	0.6587	0.6831
TOTE Ship	0.05938804	0.00	0.05551374	0.06114966
TOTE Ship increased	0.2733	0.00	0.2682	0.2769
TOTE truck loader	0.6419	0.00	0.6340	0.6503
TOTE unloader	0.6419	0.00	0.6255	0.6504



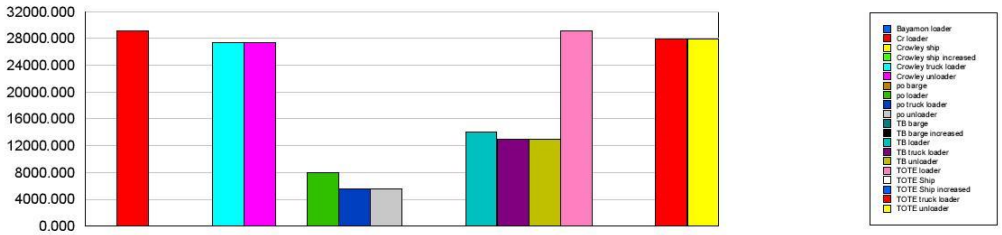
Unnamed Project

Replications: 25 Time Units: Hours

Resource

Usage

Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Bayamon loader	0.00	0.00	0.00	0.00
Cr loader	29185.72	0.42	29184.00	29189.00
Crowley ship	10.0000	0.00	10.0000	10.0000
Crowley ship increased	71.0000	0.00	71.0000	71.0000
Crowley truck loader	27350.48	8.87	27272.00	27360.00
Crowley unloader	27352.80	7.37	27290.00	27360.00
po barge	15.0000	0.00	15.0000	15.0000
po loader	8001.00	0.00	8001.00	8001.00
po truck loader	5600.00	0.00	5600.00	5600.00
po unloader	5600.00	0.00	5600.00	5600.00
TB barge	5.0000	0.00	5.0000	5.0000
TB barge increased	38.0000	0.00	38.0000	38.0000
TB loader	14089.80	0.55	14089.00	14094.00
TB truck loader	13001.04	2.15	13000.00	13026.00
TB unloader	13001.48	3.05	13000.00	13037.00
TOTE loader	29186.16	0.70	29185.00	29193.00
TOTE Ship	4.0000	0.00	4.0000	4.0000
TOTE Ship increased	28.0000	0.00	28.0000	28.0000
TOTE truck loader	27899.72	0.58	27893.00	27900.00
TOTE unloader	27900.00	0.00	27900.00	27900.00



Unnamed Project

Replications: 25 Time Units: Hours

User Specified

Time Persistent

Variable	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Bayamon inventory	0.00	0.00	0.00	0.00	0.00	0.00
Crowley Deliverable	241.18	7.31	206.38	276.38	0.00	1225.00
Crowley inventory	2794.91	16.88	2672.20	2845.79	0.00	5883.00
po Deliverable	3.0353	0.20	1.9265	3.9334	0.00	116.00
po inventory	3074.31	25.17	2930.06	3194.23	0.00	5201.00
TB Deliverable	55.9566	0.55	53.7265	59.1846	0.00	593.00
TB inventory	1361.93	4.06	1345.94	1380.38	0.00	2596.00
TOTE Deliverable	219.50	7.75	192.41	266.83	0.00	1163.00
TOTE inventory	2164.87	23.86	1910.93	2216.69	0.00	4881.00

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Vita

Captain Nicholas L. Green graduated from Desert Pines High School in Las Vegas, Nevada. Afterward, he volunteered as a service missionary through the Church of Jesus Christ of Latter-Day Saints and was assigned to work in the Guadalajara Mexico, where he got his first taste of humanitarian work. After two years, Captain Green returned home and entered the University of Nevada Las Vegas. There he graduated with a Bachelor of Arts in Psychology in the spring of 2012. He was commissioned through AFROTC Detachment 004 while at the University of Nevada Las Vegas and was recognized as a Distinguished Graduate.

His first assignment was to Sheppard AFB as a student pilot in the Euro NATO Joint Jet Pilot Training Program in the fall of 2012. While at Sheppard, Captain Green and his classmates traveled to Moore Oklahoma to help recovery efforts from the tornado disaster of 2013. His second assignment was to Kadena Air Base, Japan as a Logistics Readiness Officer in the 733d Air Mobility Squadron in the spring of 2014. While at Kadena, Captain Green had turns managing the operations center, freight terminal, and passenger terminals of the aerial port. In the fall of 2017, Captain Green entered the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduating he will serve a short tour at Incirlik Air Base Turkey, with a follow-on assignment to the Air Force Petroleum Agency at Ft. Belvoir, Virginia.

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14. ABSTRACT

In 2017 Hurricane Maria devastated Puerto Rico. The humanitarian aid community scrambled a response to support the 3.4 million people affected by the disaster. In response, thousands of shipping containers filled with supplies were sent to the island. Numerous reports surfaced regarding significant delays in receiving the shipments. This research reviews the historical account of cargo throughput into Puerto Rico following Maria. A computer simulation built in ARENA compares various what-if scenarios based on empirically collected data and interviews with FEMA, port authorities, and commercial cargo carriers to determine how the humanitarian supply chain could improve for future disaster planning. An additional goal of this research is to better inform humanitarian logisticians who must balance near-term disaster response demands with long term recovery concerns.

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