### DEVELOPMENT AND ANALYSIS OF A SOAP BATCH PROCESS USING ARENA SIMULATION TOOL

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Bу

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#### DISSERTATION

Submitted to the Electrical & Electronics Engineering Programme in Partial Fulfillment of the Requirements for the Degree Bachelor of Engineering (Hons) (Electrical & Electronics Engineering)

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## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

MUISO

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#### ABSTRACT

The objective of this project is to design and build a model of a batch process and model and simulate, and conduct a performance analysis using ARENA simulation tool. The scope of this project is to focus on a soap batch process that produces products of different flavours. It will involve mixing of different kinds of composition of chemicals to produce different flavour of liquid soaps. Its aim is so that through the analysis, efficiency of the plant would be conducted; process time and also the queue time from one batch to another. Thus, not only will it be reliable, but its availability and efficiency may increase. This report focuses on these sections: Background Study, Problem Statement, Objectives and Scope, Literature Review, Methodology and results and discussion. The procedures taken include data gathering, model building, simulation and analysis. To improve the understanding of the ARENA simulation tool, further research needs to be done to familiarize with the use of the software. Besides that, studies on the principles and theories on how to simulate a model are crucial to achieve a working simulation. Once the analysis has been done, the results will be analyzed in a report form.

#### ACKNOWLEDGEMENT

Firstly, I would like to firstly thank God Almighty that through Him all things were made possible for this project. Next, I would like to express my heartfelt gratitude to my late supervisor Dr. Muhammad Asif Sadiq and Dr. Nordin Saad who took the responsibility to continue to guide and assist me. Their continuous support and guidance throughout this whole project was much appreciated. Their ideas and general approach with respect to this project were very useful and encouraging despite other commitments and packed schedules. Lastly,I would also like to express my gratitude and special thanks to my family members and close friends who have continuously given me encouragement and the moral support to never give up till the very end.

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## LIST OF ABBREVIATIONS

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USA	United States of America
Arena PE	Arena Professional Edition
BASIP	Batch Simulation Package software package
MES	Manufacturing Execution Software
VBA	Visual Basic

# CHAPTER 1 INTRODUCTION

#### **1.1 Background Study**

In USA and European countries, simulation has helped decision makers to make the best decisions in their company although many still do depend on their experiences and intuition. The advantage of a simulator is that they are able to provide users with the practical feedback while simulating an option. Designers and engineers have the ease of comparing the alternative designs without actually building the systems. Through this, a thorough study can be made.

Another advantage of a simulation is the level of detail that can be obtained from it. Simulation is particularly advantageous when the complexity or operational variability of the systems under study renders the application of purely analytical models impossible [1, 2].

Simulation enables designers to study a problem of the simulated environment in a several levels of abstraction. By approaching a system in this manner, designers are able to understand the behaviors and interactions of the high level abstraction. Thus, it equips them to counteract with the complexity of the overall system and may then be able to verify and perform evaluation on the lower level components [3]. The system may be built on the "top-down" technique.

#### **1.2 Problem Statement**

Arising competitions and also globalization market economics have caused many companies to be advance in terms of their company's efficiency, production and also the technology. There has always been a pressure of producing products which are good in quality, yet less in production cost. Adding with the recent increase of the fuel price globally, the value of products and cost of living has increased dramatically. Thus, this adds on more pressures and also challenges for companies to overcome. It is not only time consuming but also costly to explore the various ideas and projects for the best solution. Simulation has been the next best option to identify the means to improve the companies' need.

#### 1.3 Objectives

The objectives of the project are:

- To design and build a model of a batch process
- To model and simulate, and conduct a performance analysis

#### 1.4 Scope of Study

The scope of this project is to focus on a formation of soap batch process. It will involve mixing of different kinds of composition of chemicals to produce different flavours or scented liquid soaps. Its aim is so that through the analysis, efficiency of the plant would be conducted; process time and units produced per day. Thus, not only will it be reliable, but its availability and efficiency may increase. This feasibility of this project is that it can be done within the period of 1 year (2 semesters) as long as the data gathered and information is sufficient.

## CHAPTER 2 LITERATURE REVIEW

#### **2.1 Introduction**

There are many kinds of Simulation tools available for example Arena, AutoMod, ProModel and Simul8. Research has covered other Companies using Arena and applying it in their own research and project. The purpose of this research is to see how wide companies have used the application of Arena which has so much to offer on different kinds of systems and also the different kinds of editions for Arena itself.

#### 2.2 Simulation Language for Manufacturing System

A case study has been done by Silva, Ramos and Vilarinho [4] about using Arena simulation for manufacturing of chest freezers reengineering. The study was required to increase its throughput and overall productivity to determine its limitations and problems. The relevant performance measures allowed them to identify a set of operational constraints to the manufacturing system performance. First of all, the authors studied the process of manufacturing the chest freezers and the area of the manufacturing site. It was found that between the pre-drying and the post-drying department, the post-drying area was underused and changes were needed. One could easily use an analytical technique for balancing the assembly line in the post-drying department, but the operational variability induced to the manufacturing system, as a whole, by the operations performed in the pre-drying department, renders the optimization of the manufacturing system performance impossible to achieve by analytical techniques [4].

Authors were able to collect large amounts of historical data related to the processing times involved in the manufacturing process. This allowed fittings of proper distributions of data. Thus, the distributions and its parameters were selected using the Arena's software module Input Analyzer [5]. After simulation was done and the results were obtained, the authors were able to suggest modifications. With the changes done, manufacturing system operation would be smoother and the workloads in both departments are evenly distributed.

Another research was found, presented by John Moore with the title, Production Line Simulation- A valuable tool for Process Improvement [6]. Roeslein & Associates, Incorporation wanted to design engineering solutions for their Metal Container Manufacturing, Beer & Beverage Filling and Food Packaging. Their aim was to control the quality of their products and also its consistency. The company's goal was to profit ideally by knowing the outcome before someone else does and realistically have proper investments of time and money.

4

The author explains that in the production improvement cycle, there are 4 main stages. The cycle is as shown below:

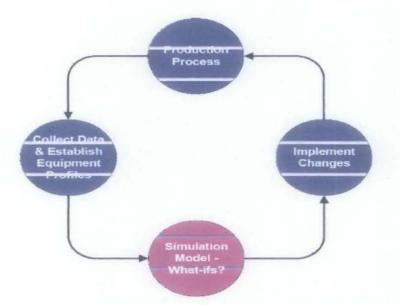


Figure 1: Production Improvement Cycle, [6]

Exact data's of the real environment were needed to simulate the model. The typical data that were collected were the up time (%), down time (%), rated speed, mechanical observations, data analysis and more. The analysis' scope was to develop What-If models and also validate the base case against the production with additional line observation. The What-If scenarios were developed for the layout constraints of the process, bottleneck issues, unbalanced line controls, improper procedures and for customer requests for a revised layout.

Rockwell Arena Modeling Software, Packaging Edition was used and it uses Simon language-based application to model process flow systems. Both discrete events and continuous process were involved and the simulation lasted for 1 to 2 days which was equal to 30 days of production in reality. The author quotes that long-term analysis can identify subtle but large causes of efficiency [6]. Indeed Moore agrees that line simulation identifies the current and maximum throughput potential, equipment layout advantages and constraints, line control constrains, and also the equipment's capabilities. Simulation reduces risk and cost and it is a low cost way to predict measurable changes to the process line [6].

#### 2.3 Modeling using ARENA

There are many kinds of editions for Arena suite of products for the purpose of modeling, simulation, and optimization highlighting product architecture and technology features. For this project, I would be using the Arena Professional Edition. From the article about the Arena product family written by Bapat, [7] it writes that Arena Professional Edition enhances Arena Standard Edition (Arena SE) with the capability to craft custom simulation objects that mirror components of the real system. The Arena template has a whole collection of modules that provides general features for modeling all types of applications like resources, queuing, process logic and system data. It is proven that Arena effectively models combined discrete/continuous system, for example chemical production through its built-in continuous modeling capabilities. Its SIMAN simulation language provides a powerful foundation for modeling complex systems and a fast simulation engine for efficient analysis of design alternatives. Simulation models have the flexibility to be created from "top-down" adding detail at a lower level of hierarchy as a project progresses or bottom up by combining individual submodels into a complete system model.

Control logic and MES software implementations in the Arena allows the user to slow down the simulation model to run in a real time to provide human timescale system responses. Thus, it makes it possible to test a wide variety of scenarios that would otherwise take an excessively long time to accomplish when working with the real system [7]. Thus, it is proven that Rockwell Software customers uses Arena PE do exploit simulation more effectively because they can build complete, self-contained templates and deliver it to others in the enterprise. Model construction can be made to match closely elements of the real system not

only terminologically but also in the important aspects of model logic, collection of performance measures, and animation. Indeed Rockwell Software has continually risen up and lead in providing cutting-edge tools to address the changing environment in a simulation use.

#### 2.4 Simulation Language for Processes with continuous and discrete systems

According to the report by Marcelo, Luiz and Daniel [8], it is proven that Arena is able to simulate processes which combine continuous and discrete simulation components. They have built a simulation model of the logistics of the San Lorenzo refinery of PETROBRAS ENERGIA (Argentina) using refinery templates in Arena. Templates allows user to pack an important amount of logic, animation and data in a single object which is transparent to the user [8]. Using refinery template allows an organization to successfully model very complex refinery process and logistics. Also, the model is user friendly where people with just a basic training in simulation can use and modify the process definition, operation logic and test different plant configurations. Thus reduce the time needed to build a model.

Arena can also simulate for high-speed combined continuous and discrete food industry manufacturing processes. In the report by A.M. Huda and C.A Chung [9], the transformation of a product from a fluid state into distinct packages requires systems that are modeled both continuously and discretely with respect to time. Certain systems which are more complex requires continuous event or combined discrete and continuous event simulation to develop valid models [9]. Indeed food processing industry is unique where the system must first be modeled with a continuous event approach and then later with a discrete event approach. For a combine system, the continuous variable must be carefully designed to maintain a balance between continuous and discrete part because the continuous variable is monitored as it passes a threshold value which in may trigger a discrete change. The state of a system changes with time for a continuous model. This change is represented by a state equation which is affected by the changing of the derivative of the state system. We need to be aware that the integration process to solve the differential equations in the continuous component can present problems when the time advance involved is not carefully specified. It should not be too large as it may result in a negative state variable value. Another issue arises is how combined models (continuous and discrete) affects one another. Pritsker states that this can occur in three ways [10]. First way is that a continuous state variable achieving a threshold value may cause a discrete event to occur. Then, a discrete event can affect the value of a continuous state variable. Next, the relationship governing a continuous state variable can be changed at a particular time due to the discrete event [9].

During simulation especially for a combined system, the selection of experimental factors is vital. It becomes more complicated because the analyst has a choice to select continuous related factors, discrete related factors or both types. The authors concluded that modelers for a combined system should expect to encounter unique data collection- continuous to continuous component, continuous to discrete component, discrete to continuous component, and factor selection modeling and analysis issues [9].

#### **2.5 Simulation Language for Batch Process**

According to the report by M. Fritz, A. Liefeldt and S. Engell with the title "Recipe-driven batch process: Event handling in Hybrid System Simulation", recipe-driven chemical processes can be simulated both in the continuous and in the discrete-event domain with its own specific advantages and limitations. The report was based on the simulation done by Batch Simulation Package software package (BASIP). Discrete batches of material are transformed in a series of steps of finite duration which is also known as a batch mode. A recipe is usually defined by a sequential function chart that consists of steps and transitions with concurrency [11].

#### 2.6 Ways to produce Soap

There are 2 types of ways to produce soap. The first system starts from raw materials which involve oil or tallow and soda. The whole process may include the saponification plant, the dryer vacuum plant and also the soap finishing line. The other system would be the finishing lines starting from soap noodles (pellets). Soap finishing is the transformation of soap noodles into formulated stamped soap bars [12]. The process of soap finishing includes pre-refining, mixing, refining and extrusion, stamping and packaging. In this project, it will be similar to the second system of producing soap.

# CHAPTER 3 METHODOLOGY

## 3.1 Schematic flow process of the project:

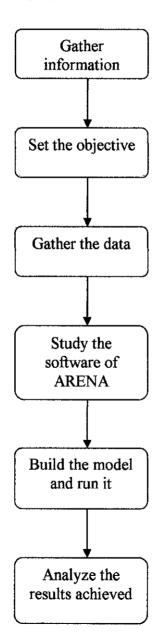


Figure 2: Flow process of project

First of all, more information about the Rockwell Arena Simulation Tool is needed to start of the project. Besides that, understanding the general principles of running a simulation are required to be aware of the functions and also the different kinds of simulation environments (for example: discrete-event simulation). Then, determine the objective of the project.

Then, datas are gathered to learn how to simulate batch processes using ARENA software. When the data has been collected, it is important to understand the process flow of the simulation. With the basic knowledge of the simulation software, it would be easier to apply and build the model. Exact settings and data's are needed to obtain the results which are reasonable with the real model. After running the simulation, the results should be analyzed to better understand the behavior and problems occurred. Thus, suggestions could be made.

## 3.2 Main flow process of the simulation

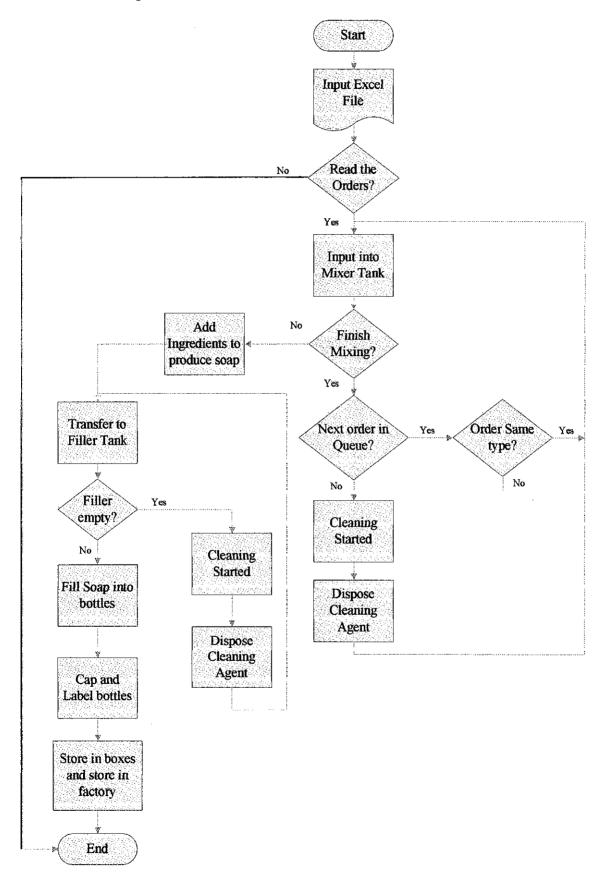


Figure 3: Main flow of the simulation

When the button "Run" is pressed, then the simulation will start. It will read the excel file which contains the order of the soap from the customers. The details will be discussed further in the result section of this report. Then the products to prepare the soap will enter the mixer tank. When the mixing is done, it will be sent to the filler tank to be filled up into bottles, capped, labeled and then stored in boxes and to the factory.

Whenever the filler tank is empty, it will start cleaning the tank using the cleaning agent. Other than that, when the mixing has been completed and the next order (flavour) in queue is not the same flavour as the previous one, it will clean the tank. This is to avoid any contamination of different flavours.

#### 3.3 Basic skills of ARENA software building and simulation model

There are a few simulation concepts in the Arena that we need to understand first. *Modules* are the flowchart and data objects that define the process to be simulated. All information required to simulate a process is stored in modules. *Entities* represent the objects moving through the system. Each entity has its own characteristics, referred to as *attributes*. The purpose of a *queue* is to provide a waiting space for entities whose movement through the model has been suspended due to the system status (e.g. busy). There are 2 types of queues used by Arena. Individual queues have a symbolic name, a ranking rule and a specific capacity. Internal queues provide a basic first-in, first-out container for entities at a particular activity (module), but do not provide animation, statistics or ranking mechanisms.

*Resources* are stationary elements of a system that can be allocated to entities. They have a specified capacity at any point in time and a set of states (e.g. busy, idle, inactive) that they transition between during a simulation run. Resources may be represented as people, machines or even space in a storage area. *Storages* are a second type of passive construct for containing entities. An entity may undergo a series of activities while in a storage, however must explicitly specify its departure from the storage. The movement of entities through a series of processes or activities may be captured in a single table called a *sequence*, which defines the series of stations to be visited by the entity. A sequence contains an ordered set of steps, each defining a station to be visited and, optionally, data to be used when the entity performs the activity at the sequence step.

*Conveyors* are devices that move entities from one station to another in a single direction. *Transporters* on the other hand are a type of device that moves entities through the system. They can be represented as fork trucks or delivery vehicles. Information such as the transporter's speed and travel distances between stations are required.

#### 3.4 From the Example in Arena Simulation Tool

The figure below shows the example of the super soap batch process. There are 3 kinds of fluids, water, active and fragrance which will be mixed inside the mixer tank. Super Soap produces 4 types of scented liquid soap-Apple, Lemon, Peach and Strawberry. The filler and mixer are cleaned in between orders of different products. The filler is required to fill the bottles and then it'll be capped and packed into boxes.

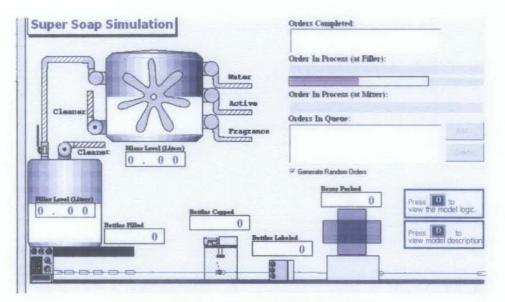


Figure 4: Super Soap Simulation, [13]

# CHAPTER 4 RESULT AND DISCUSSION

#### 4.1 Experimentation/Modelling

For this project, it will be a modified version of the example found in the ARENA simulation software. The design of the Soap Batch process plant will also produce 4 flavours or scented liquid soaps- Apple, Lemon, Peach and Strawberry. However, the orders of the different kinds of soap will be as scheduled in an Excel file where customers can determine the orders. The example is as shown in Table 1 and it will be simulated for a day's production.

Flavour	BottleSize (Liters)	Boxes
Apple	1.18	877
Lemon	1.18	837
Strawberry	1.18	940
Peach	1.18	907

Table 1: Customer's Order

So far, all the logics and block diagrams have been created. This includes mixing and batch logic, filler animation, filler logic, labeler logic, labeler animation, capper logic and also the packing logic. The Visual basic codes (VBA) will be shown in the Appendices.

#### 4.1.1 Submodels

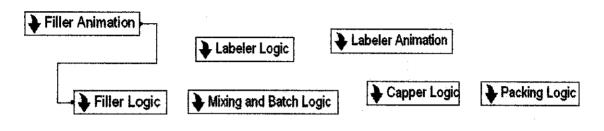


Figure 5: Submodels

Figure 5 shows the submodels that are required to build the simulation. The different processes that are involved are the filler tank which fills the soap into bottles, labeler of the bottles, mixing and batching of the soap, putting on caps on individual bottles of and also the packing of the soap into its boxes.

#### 4.1.2 Mixing and Batch Logic

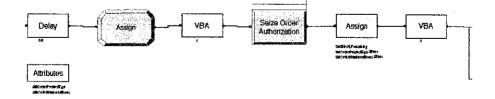


Figure 6: Mixing and Batch Logic

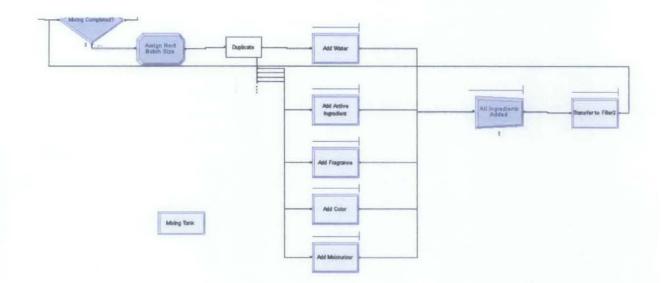


Figure 7: Mixing and Batch Logic

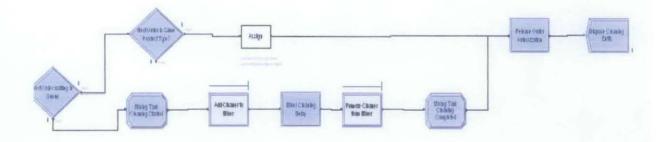


Figure 8: Mixing and Batch Logic

As shown in Figure 6,7 and 8, the logic shows that the orders from the Excel file will be inputted into the program in Arena. It seizes the order and then enters to the logic where the mixing is done. If the mixing has been completed, the mixer will be cleaned first before the next batch of liquid soap for a different flavour is mixed. If the flavour is still the same, the cleaning process will not be done.

### 4.1.3 Filler Animation

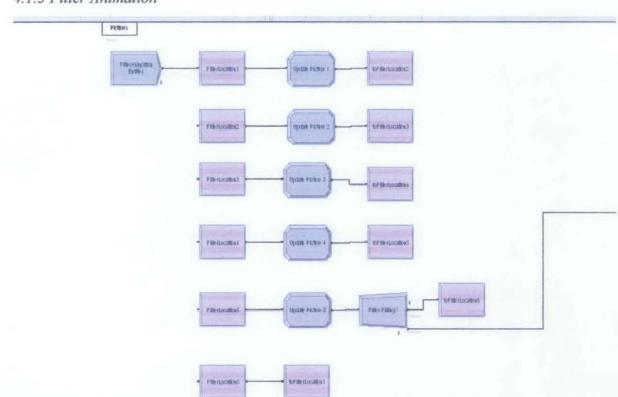


Figure 9: Filler Animation Logic

In Figure 9, the block logic is required to change the picture of the animation for filler tank depending on the different situations.

## 4.1.4 Filler Logic

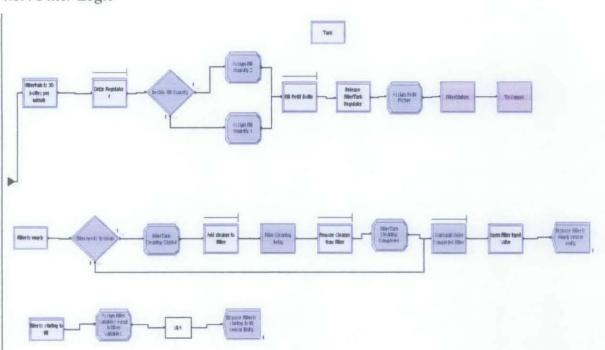
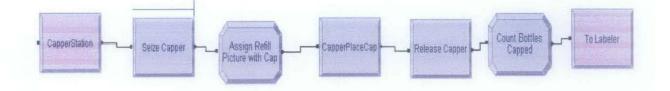


Figure 10: Filler Logic

Figure 10 shows how the filler tank works. It fills up the soap from the tank into empty bottles. When the filler is filled with a different kind of flavour of soap, the cleaning process will take place to avoid any contamination of flavours. After the filling process, the bottles of soap will be send to the capper station where it will be capped.s

## 4.2.5 Capper Logic





The capper logic as shown in Figure 11 is to ensure that the bottles will be capped and then send to the labeler for labeling.

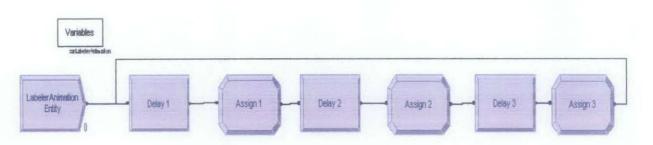
4.1.6 Labeler Logic



Figure 12: Labeler Logic

The labeler logic in Figure 12 ensures that the bottles are labeled according to the correct flavour then it is send to the packing station to be packed into boxes.

### 4.1.7 Labeler Animation



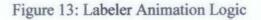
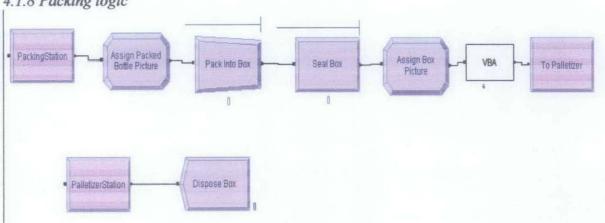


Figure 13 of the labeler animation is to ensure that the picture of the labeler animation changes according to the different situation.



4.1.8 Packing logic

Figure 14: Packing Logic

The packing logic as shown in Figure 14 is to make sure that the bottles will be packed into boxes, sealed and then send to the palletizer where the boxes will be stored and then delivered to customers.

## 4.1.9 Full Animation

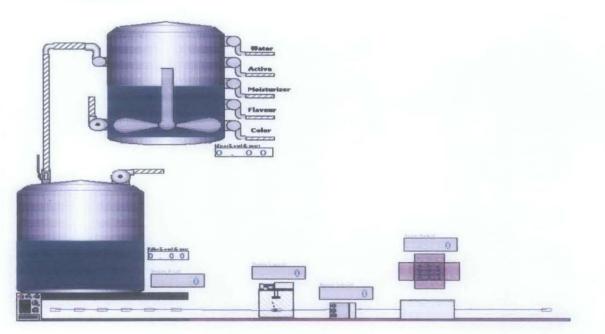


Figure 15: Full animation

The full animation is as shown in Figure 15. Each flavours that enter the mixer tank, different colors has been assigned to them - Apple (Green), Peach(Orange), Strawberry (Pink), Lemon(Yellow).

#### 4.2 Simulation Results

After simulating the process to run for a day which is 1440 minutes, the results will report on the entities (bottles), process time (seal boxes), queue time, resources (tanks and stations) and tanks.

#### 4.2.1 Entity

Entity in this case is referring to the bottles that are transferred within the process when the simulation is running. The results are shown in Table 2. The waiting time is 2.2 minutes for a bottle where there is a delay at a process also known as a queue. The transfer time to refill the bottle on the conveyor is 5.52 minutes. Value added time is the accumulated time when an entity incurs a delay at a value added process which is 0.43 minutes. The number of bottles entering the process to be filled when the simulation is running is 46202 bottles and the 46176 bottles exiting the system.

Minutes
2.2
5.52
0.43
Value
46202
46176

Table 2: Entity Results

The process in this case is the sealing of boxes when the simulation is running. Each box contains 12 bottles and after that, the sealed box will be sent for storage. As shown in Table 3, the average total time per box is 0.03 minutes while the accumulated total time for the process is 118.4 minutes on average.

	Average (Minutes)	
Total Time per Entity	0.03	
Accumulated Total Time	118.4	
	Value	
Number Out	3552	
Number In	3552	

Table 3: Process Time

#### 4.2.3 Queues

The queue time for the simulation is as shown below in Table 4. For the bottles to be packed into boxes, the queue is 0.18 minutes. For the process to read the order list, it takes 92.93 minutes and to wait until the order is completed at the filler tank, it takes 0.5 minutes. The queue for the order to be completed is 3.4 minutes. In Figure 16, the queue time is similar except for seize order authorization.queue that spiked up to 92.93 minutes.

Number waiting column is the section where it reports the number of entities waiting in each queue. The number of bottles waiting in line to be packed is 5.43 and the seize order queue is 1.84. For the wait until order has completed, it has 0.06 in queue. As shown in Figure 16, the number waiting in queue are almost similar.

· · · · · · · · · · · · · · · · · · ·	Time (Minutes)	Number Waiting
All Ingredients Added Queue	0.00	0.00
Pack Into Box Queue	0.18	5.43
Seal Box.Queue	0.00	0.00
Seize Capper2.Queue	0.00	0.00
Seize Filler2Tank Regulator Queue	0.00	0.00
Seize OrderAuthorization Queue	92.93	1.84
Wait Until Order Completed Filler.Queue	0,50	0,00
Wait Until Order Completed Queue	3.40	0.06

Table 4: Queue Time

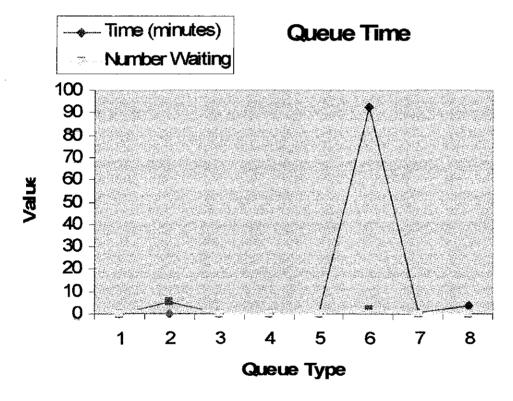


Figure 16: Queue Time

In this section, the resources refer to the stations and machines. The results are as shown in Table 5. Instantaneous utilization reports the statistics on the resource's utilization at any instant time. Thus, 0.49 means that it was busy for 49% of the time during the simulation; 1.00 means 100% and 0.08 means 8% of the time during the simulation. Number busy column reports the number of busy resource units which is similar to instantaneous utilization. Number scheduled section reports the number of scheduled resource units which is 100% for all three sections. Number seized at the capper station would be 42639 bottles (as mentioned earlier), 27 orders read and 3552 boxes packed. Scheduled utilization reports the cumulative average utilization over the time period that the resource was actually scheduled in the system.

	Inst Util	Num Busy	Num Sched	Num Seized	Sched Util
Capper2	0.49	0.49	1.00	42639.00	0.49
OrderAuthoriz	1.00	1.00	1.00	27.00	1.00
Packing	0.08	0.08	1.00	3552.00	0.08

Table 5: Resources Results

The tank level results are shown in Table 6. The average level for the filler tank is 92.04 and the total quantity added into the tank is 51606.64 and quantity removed is 51506.64. The average level for the mixing tank is 211.42 and the total quantity added into the tank is 57310.48 and quantity removed is 57306.64.

Level	Total Quantity Added	<b>Total Quantity Removed</b>
92.04	51606.64	51506.64
211.42	57310.48	57306.64
	92.04	92.04 51606.64

Table 6: Tank Level

#### **4.3 More Simulation Results**

In this section, 3 more simulation results will be shown to compare the results with the first simulation results.

4.3.1 One flavour and lesser liters

The flavour that is chosen for this simulation is Apple with 0.708 liters per bottle. The results are similar for the queue time and resource results. The only difference would be the entity, processes and tank results. In Table 7, the entity for number in and number out has increased from the first results which are 46202 and 46176 each. As shown in Table 8, the total time per entity and accumulated total time are similar. The number of boxes in and out of the system however are 3581 each. The tank level for total quantity added and removed has reduced. The results are as shown in Table 9.

	Minutes
Waiting Time	2.2
Transfer Time (Refill Bottle)	5.52
Value Added Time	0.43
	Value
Refill Bottle (Number in)	46202
Refill Bottle (Number out)	46176

Table 7: Entity results

	Average (Minutes)
Total Time per Entity	0.03
Accumulated Total Time	118.4
	Value
Number Out	3581
Number In	3581

Table 8: Process Time

Table 9: Tank Level

· · · · ·	Level	Total Quantity Added	Total Quantity Removed
Filler2Tank	96.03	30539.04	30439.04
MixingTank	225.53	30619.58	30539.04

4.3.2 Customer's orders are reduced by 25%

The customer's orders are reduced by 25% of the original data as shown in Table 1. The liters per bottle are reduced to 0.708 liters. After simulating the orders, it is shown in Table 10 and 11 that the number of bottles and boxes produced has decreased. In Table 12, the resources are not as busy. Besides that, in Table 13 it shows that the tank level has also decreased. However, for the queue time, it is similar and there are not many changes.

Table 10: Entity results	Table	10:	Entity	results
--------------------------	-------	-----	--------	---------

Minutes
2.2
5.52
0.43
Value
41618
41613

Table	1	1	·	Process	Time
THOIC		T	٠	1100000	runo

	Average (Minutes)
Total Time per Entity	0.03
Accumulated Total Time	106.70
	Value
Number Out	3201
Number In	3201

Table 12: Resources Results

	Inst Util	Num Busy	Num Sched	Num Seized	Sched Util
Capper2	0.44	0.44	1.00	38412	0.44
OrderAuthoriz	0.90	0.90	1.00	24	0.90
Packing	0.07	0.07	1.00	3201	0.07

Table 13: Tank Level

	Level	Total Quantity Added	<b>Total Quantity Removed</b>
Filler2Tank	84.37	28995.70	28995.70
MixingTank	193.29	36195.70	36195.70

In the last simulation, the customer's orders are reduced by 50% from the orders shown in Table 1. The liters per bottle are now 0.708 liters. As shown in Table 14 and 15, the number of boxes and bottles produced has decreased by half. In Table 16, it shows that the resources are not as busy. Besides that, the tank level as shown in Table 17 shows that it decreased by half. However, for the queue time, it is similar and there are not many changes.

Minutes
2.2
5.52
0.43
Value
23106
23101

Table 14: Entity results

Table 15: Process Time

	Average (Minutes)
Total Time per Entity	0.03
Accumulated Total Time	59.23
	Value
Number Out	1777
Number In	1777

Table 16: Resources Results

	Inst Util	Num Busy	Num Sched	Num Seized	Sched Util
Capper2	0.25	0.25	1.00	21324	0.25
OrderAuthoriz	0.50	0.50	1.00	16	0.50
Packing	0.04	0.04	1.00	1777	0.04

Table 17: Tank Level

	Level	Total Quantity Added	<b>Total Quantity Removed</b>
Filler2Tank	46.52	16397.39	16397.39
MixingTank	108.06	21597.39	21597.39

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**,** 1<sup>3</sup> −

#### CHAPTER 5

#### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Conclusion**

As a conclusion, if the simulation is done for only one flavour of soap and when the liters per bottle decreases, there will be more boxes and bottles in production. When the orders and the liters per bottles are reduced, the production of boxes and bottles will decrease too. Other than that, the resources (machines/stations) will not be as busy.

Indeed it is challenging to be able to simulate a batch process from a plant. From this study, companies will be able to work more efficiently and effectively through simulation software similar to ARENA.

#### 5.2 Recommendation

There are a few recommendations that can be made. One of them would be to conduct further studies on similar and more complicated batch processes for example the food processing industry. The second recommendations would be to explore the continuous processes like the natural gas and petroleum industry.

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# **APPENDICES**

## APPENDIX I LOGIC VBA CODES

Private Sub cmdAddOrder\_Click() frmAddOrder.Show vbnonmodal End Sub Private Sub cmdDeleteOrder\_Click() With ActiveModel.SIMAN .QueueRemoveEntity.QueueEntityLocationAtRank(lstOrdersInQueue.ListIndex + 1, .SymbolNumber("Seize Order Authorization. Queue")), SymbolNumber("Seize Order Authorization. Queue") End With 1stOrdersInQueue.RemoveItem lstOrdersInQueue.ListIndex lstOrdersInQueue.ListIndex = -1 cmdDeleteOrder.Enabled = False End Sub Private Sub lstOrdersInQueue Click() If (lstOrdersInQueue.ListCount > 0) Then cmdDeleteOrder.Enabled = True End If End Sub Private Sub ModelLogic DocumentOpen() Call ClearControls End Sub Private Sub ModelLogic\_RunBeginSimulation() 'chkGenerateRandomOrders.Enabled = False Set ISIMAN = ThisDocument Model SIMAN 'Open Excel spreadsheet to read values from Set oExcelApp = CreateObject("Excel.Application") oExcelApp.Visible = True Set oWorkbook = oExcelApp.Workbooks.Open("Soapy.xls") Set oWorkSheet = oWorkbook.ActiveSheet Set oExcelAppRange = oWorkSheet.Range("A2:B2:C2") g Flavour = ISIMAN.SymbolNumber("attrOrderProductType") g\_BottleSize = ISIMAN.SymbolNumber("attrOrderBottleSize") g\_Boxes = ISIMAN.SymbolNumber("attrOrderNumberOfBoxes") End Sub Private Sub ModelLogic\_RunEnd() Call ClearControls End Sub Private Sub VBA\_Block\_12\_Fire() If (lstOrdersInQueue.ListCount = 0) And (lblOrderInProcess.Caption = "") Then lblAddMessage.Caption = "Click the Add button to simulate an order." End If End Sub Private Sub VBA Block 13 Fire() lblAddMessage.Caption = "" End Sub Private Sub VBA\_Block\_15\_Fire()

```
Dim i As Integer
If (chkGenerateRandomOrders.value = True) Then
  'Generate random orders
  For i = 1 To 2 - lstOrdersInQueue.ListCount
    Call GenerateRandomOrder
  Next
End If
End Sub
Private Sub GenerateRandomOrder()
Dim lngEntityNumber As Long
Dim intFragrance As Integer
Dim dblBottleSize As Double
Dim intNumberOfBoxes As Integer
With ActiveModel.SIMAN
 IngEntityNumber = .EntityCreate
 intFragrance = Int(.SampleUniform(1, 4.9999, 10))
 .EntityAttribute(IngEntityNumber, .SymbolNumber("attrOrderProductType")) = intFragrance
 dblBottleSize = .SampleUniform(0, 1, 10)
 If (dblBottleSize <= 0.5) Then
   dbiBottleSize = 0.708
 Else
   dblBottleSize = 1.18
 End If
 .EntityAttribute(IngEntityNumber, .SymbolNumber("attrOrderBottleSize")) = dblBottleSize
 IngNumberOfBoxes = Int(.SampleUniform(10, 30, 10))
 .EntityAttribute(IngEntityNumber, .SymbolNumber("attrOrderNumberOfBoxes")) = IngNumberOfBoxes
 .EntitySendToBlockLabel IngEntityNumber, 0, "StartOrder"
End With
End Sub
Private Sub VBA_Block_4_Fire()
'Remove from "In Queue" List
lstOrdersInQueue.RemoveItem 0
End Sub
Private Sub VBA_Block_18_Fire()
'Set "Order In Process" Fields
Dim intProductType As Long
Dim strProductType As String
Dim strBottleSize As String
Dim strNumberBoxes As String
With ActiveModel.SIMAN
  intProductType = .VariableValue(.SymbolNumber("varOrderProductType.Filler"), 0, 0)
  Select Case intProductType
  Case 1
    strProductType = "Apple"
  Case 2
    strProductType = "Lemon"
  Case 3
    strProductType = "Peach"
  Case 4
```

```
strProductType = "Strawberry"
  End Select
  strBottleSize = . VariableValue(.SymbolNumber("varOrderBottleSize.Filler"), 0, 0) & " Liters"
  strNumberBoxes = . Variable Value(.SymbolNumber("varOrderNumberOfBoxes.Filler"), 0, 0) & "Boxes"
  lblOrderInProcess.Caption = strProductType & "," & strBottleSize & "," & strNumberBoxes
  Call UpdateOrderCompletedPercentage
End With
End Sub
Private Sub VBA Block 21 Fire()
'Set "Order In Process Mixer" Fields
Dim intProductType As Long
Dim strProductType As String
Dim strBottleSize As String
Dim strNumberBoxes As String
With ActiveModel.SIMAN
  intProductType = .VariableValue(.SymbolNumber("varOrderProductType.Mixer"), 0, 0)
  Select Case intProductType
  Case 1
    strProductType = "Apple"
  Case 2
    strProductType = "Lemon"
  Case 3
    strProductType = "Peach"
  Case 4
    strProductType = "Strawberry"
  End Select
  strBottleSize = .VariableValue(.SymbolNumber("varOrderBottleSize.Mixer"), 0, 0) & "Liters"
  strNumberBoxes = .VariableValue(.SymbolNumber("varOrderNumberOfBoxes.Mixer"), 0, 0) & " Boxes"
  IblOrderInProcessMixer.Caption = strProductType & "," & strBottleSize & "," & strNumberBoxes
  'Remove from "In Queue" List
  IstOrdersInQueue.RemoveItem 0
End With
End Sub
Private Sub VBA Block 22 Fire()
lblOrderInProcessMixer.Caption = ""
End Sub
Private Sub VBA Block 5 Fire()
Dim strDateTime As String
Dim dblCurrentTime As Double
With ActiveModel.SIMAN
  'Add the order to the "Orders Completed" list
```

```
dblCurrentTime = .RunCurrentTime
```

```
strDateTime = .CalendarDayOfMonth(dblCurrentTime) & "/" & .CalendarMonth(dblCurrentTime) & "/" &
```

```
.CalendarYear(dblCurrentTime)
```

```
strDateTime = strDateTime & " " & .CalendarHour(dblCurrentTime) & ":" & .CalendarMinute(dblCurrentTime) & ":" &
.CalendarSecond(dblCurrentTime)
  IstOrdersCompleted.AddItem strDateTime & " " & IblOrderInProcess.Caption
  'Clear the "Order In Process" label
  lblOrderInProcess.Caption = ""
  lblOrderCompletedPercentage.Caption = ""
End With
End Sub
Private Sub VBA Block 7 Fire()
Dim intProductType As Long
Dim strProductType As String
With ActiveModel.SIMAN
  'Add the order to the "Orders In Queue" list
  intProductType = .AttributeValue(.ActiveEntity, .SymbolNumber("attrOrderProductType"), 0, 0)
  Select Case intProductType
  Case 1
    strProductType = "Apple"
  Case 2
    strProductType = "Lemon"
  Case 3
    strProductType = "Peach"
  Case 4
    strProductType = "Strawberry"
  End Select
  istOrdersInQueue.AddItem strProductType & "," & .AttributeValue(.ActiveEntity,
.SymbolNumber("attrOrderBottleSize"), 0, 0) & " Liters," & .AttributeValue(.ActiveEntity,
.SymbolNumber("attrOrderNumberOfBoxes"), 0, 0) & " Boxes"
End With
End Sub
Private Sub ClearControls()
lblOrderInProcess.Caption = ""
lblOrderInProcessMixer.Caption = ""
lstOrdersCompleted.Clear
lstOrdersInQueue.Clear
cmdAddOrder.Enabled = False
cmdDeleteOrder.Enabled = False
lblOrderCompletedPercentage.Caption = ""
lblAddMessage.Caption = ""
lblAddMessage.Enabled = True
lblAddMessage.BackColor = RGB(242, 242, 242)
chkGenerateRandomOrders.Enabled = False
chkGenerateRandomOrders.BackColor = RGB(242, 242, 242)
lblOrderInProcessMixer.FontSize = 10
End Sub
Private Sub VBA_Block_8 Fire()
Call UpdateOrderCompletedPercentage
End Sub
Private Sub UpdateOrderCompletedPercentage()
Dim IngOrderSize As Long
```

Dim IngOrdersCompleted As Long

IngOrderSize =

ActiveModel.SIMAN.VariableValue(ActiveModel.SIMAN.SymbolNumber("varOrderNumberOfBoxes.Filler"), 0, 0) IngOrdersCompleted = ActiveModel.SIMAN.VariableValue(ActiveModel.SIMAN.SymbolNumber("varBoxesPacked"), 0, 0)

lblOrderCompletedPercentage.Caption = CLng((IngOrdersCompleted / IngOrderSize) \* 100) & "% Completed" End Sub

## APPENDIX II GANTT CHART

#### First semester:

	Activity								Wee	ek					
	Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Briefing from Coordinators and Meet Supervisor														
2	Obtain simulation software														
3	Contact Engineers and perform data gathering														
4	Understand and familiarize with the software														
5	Submission of Preliminary report														
6	Research and familiarize with the data collected														
7	Submission of Progress report														
8	Submission of draft report														
9	Submission of Interim report														
					-		•	•	•		•				

#### Second semester

	A _ (* */			-					Wee	ek					
	Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Project work continue. - Determine the codes and logic														
2	Submission of Progress Report 1				٠										
3	Determine the Equation and Variables														
4	Submission of Progress Report 2								٠						
5	Preparing the Animation														
6	Analyzing the simulation														
7	Seminar (Compulsory)														[ 
8	Poster Exhibition										•				
9	Submission of Dissertation (soft bound)												٠		
10	Oral Presentation													•	
11	Submission of Project Dissertation (hard bound)														•

## APPENDIX III SIMULATION RESULTS

.

ns: 1 Time Units: Minutes

## **Key Performance Indicators**

t**em** Imber Out Average **3,631** 

ns: 1 Time Units: Minutes

## Area (Level 000)

#### ulated Time

#### **∖** Time

	Value	
ition	0.00	
on1	0.00	
on2	0.00	
on2 on3	0.00	
o <b>n4</b>	0.00	
on5	1421.47	
on6	0.00	
n	0.00	
tion	0.00	
on	118.40	
ition	0.00	
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	e e menos es concertante en entre en concertante de la concertante de la concertante de la concertante de la c analista de la concertante en entre en concertante en la concertante en la concertante en en concertante en conc en la concertante en s	
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ion2	0.00	
ion3	0.00	
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n	0.00	
ition	0.00	
tion	0.00	
ation	0.00	

1 Minutes Time Units: 15:

## Area (Level 000)

## ulated Time

ansfer Time	
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ation	0.00
tion1	0.00
tion2	0.00
tion3	0.00
tion4	0.00
tion5	0.00
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n	0.00
ation	0.00
tion	0.00
ation	0.00
ait Time	Value
	Value
ation	0.00
tion1	0.00
tion2	0.00
tion3	0.00
tion4	0.00
tion5	0.00000000
tion6	0.00
n	0.00
ation	0.00
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ation	0.00

ns: 1 Time Units: **Minutes** 

## Area (Level 000)

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er Time		
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ion	710.63	
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n3	0.00	
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5	0.00	
6	0.00	
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ion	0.00	

is: 1 Time Units: Minutes

## Area (Level 000)

#### ulated Time

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1	0.00	
	7932.80	
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			Minimum	Maximum	
	Average	Half Width	Value	Value	
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			Minimum	Maximum	
	Average	Half Width	Value	Value	
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ime			Minimum	Maximum	
	Average	Half Width	Value	Value	
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## er Entity

<sup>2</sup> er Entity	Average	Half Width	Minimum Value	Maximum Value	
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Per Entity	Average	Half Width	Minimum Value	Maximum Value	
	0.00	0.000000000	0.00	0.00	₩₽₽₽₽₽₽₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
› Per Entity	Average	Half Width	Minimum Value	Maximum Value	
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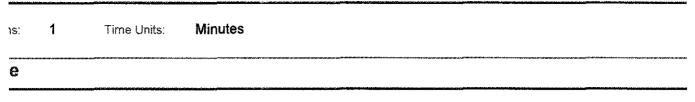
me	Average	Half Width	Minimum Value	Maximum Value
nts Added.Queue	0.00	0.000000000	0.00	0.00
ox.Queue	0.1833	(Correlated)	0.00	0.3667
ueue	0.00	0.000000000	0.00	0.00
er2.Queue	0.00	0.000000000	0.00	0.00
2Tank Jueue	0.00000000	(Correlated)	0.00	0.00000000
rAuthorization.Queue	92.9304	(insufficient)	0.00	282.44
Prder Completed	0.5000	(Insufficient)	0.5000	0.5000
)rder Queue	3.3973	(Insufficient)	3.3249	5.2081

Vaiting	Average	Half Width	Minimum Value	Maximum Value	
nts Added.Queue	0.00	(Insufficient)	0.00	3.0000	یک ایک ایک ایک ایک ایک ایک ایک ایک ایک ا
ox.Queue	5.4270	0.031831601	0.00	12.0000	
ueue	0.00	(Insufficient)	0.00	0.00	
er2.Queue	0.00	(Insufficient)	0.00	0.00	
2Tank Queue	0.00000000	(Correlated)	0.00	1.0000	
rAuthorization.Queue	1.8380	(Insufficient)	0.00	6.0000	
Prder Completed	0.00451389	(Insufficient)	0.00	1.0000	
)rder .Queue	0.06133998	(Insufficient)	0.00	1.0000	

15:	1	Time Units:	Minutes
e			

ous Utilization	Average	Half Width	Minimum Value	Maximum Value	
source	0.4935	0.002669433	0.00	1.0000	ana postana anterna de la composta
rization	0.9992	(Insufficient)	0.00	1.0000	
source	0.08222222	0.000495347	0.00	1.0000	
usy	Average	Half Width	Minimum Value	Maximum Value	
source	0.4935	0.002669433	0.00	1.0000	₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽
rization	0.9992	(Insufficient)	0.00	1.0000	
source	0.08222222	0.000495347	0.00	1.0000	
cheduled	Average	Half Width	Minimum Value	Maximum Value	
source	1.0000	(Insufficient)	1.0000	1.0000	
rization	1.0000	(Insufficient)	1.0000	1.0000	
source	1.0000	(Insufficient)	1.0000	1.0000	
I Utilization	Value				

source	0.4935
rization	0.9992
source	0.08222222



#### iber Seized

source	42639.00		
rization	27.0000		
source	3552.00		
000	na serie en antenen en	aa aa aa ahaa ahaa ahaa ahaa ahaa yoo yoo ahaa ahaa	a tana a a a a a a a a a a a a a a a a a
000	and the second	and a monotonic static design and a second secon	
000	an and a second of the second	and a submitted and a subsect of the state of the	non and the second s
000			
000			a Capte C Reson to
			📓 OrderArthorization
		an an ann an ann ann ann an ann an ann	D Packing Resource
000		n Miran Manun Matana (1997) a 1976 a ga ga ga ga na manga ga ga ga ga ga ga ga sa manana a sa sa sa sa sa sa s	
000	nya na	anan sharkani dar pala ba markati ba ang pala 5 panapang 1 p bandang p Panamara na sa sa sa sa sa sa sa sa	were the sport pro-
000 000		مر المراجع الم المراجع المراجع	
.000			<u>aanaa ka k</u>

ntities Transferring	Äveräge	Half Width	Minimum Value	Maximum Value	
ition	4.9353	0.026119271	0.00	6.0000	9999999 WHINE BERKEN BERKEN UND DE SENSE DE SEN
ion1	0.00	0.000000000	0.00	1.0000	
ion2	1.0000	0.00000000	0.00	2.0000	
ion3	1.0000	(Correlated)	0.00	2.0000	
ion4	1.0000	(Correlated)	0.00	2.0000	
ion5	0.9999	(Correlated)	0.00	2.0000	
ion6	0.9999	(Correlated)	0.00	2.0000	
n	0.00	(Insufficient)	0.00	0.00	
ition	3.4543	0.018918551	0.00	4.0000	
ion	4.9343	0.027867585	0.00	6.0000	
ation	0.2878	0.001730046	0.00	1.0000	

#### ts: 1 Time Units: Minutes

	Average	Half Width	Minimum Value	Maximum Value	
<b>₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩</b>	92.0427	(Correlated)	0.00	100.00	
	211.42	3.09650	0.00	500.00	
iity Added					
	Value			7/7 I7	
	51606.64				
	57310.48				
					图 Filkr2Taa 图 filkrgTar

57306.64

oap Bat	ch Process	anna Maria ann an Aonaichtean an Aonaichtean ann an Aonaichtean an Aonaichtean ann an Aonaichtean ann an Aonaic	ar san an a		Replications: 1
ition 1	Start Tim	ie: <b>0.00</b>	Stop Time:	1,440.00	Time Units: Minutes
etail Sun	nmary				
	NVA Time	Other Time	Total Time	Transfer Time	VA Time
le	0.00	0.20	1.02	5.52	0.43
	0.00	0.20	1.02	5.52	0.43
egarma, anga egarma ya musha ku Mirika da ANBA	Number In	Number Out		,	
	3	1			
e	46,202	46,176			
	46,205	46,177			

oap Batch P	Replications: 1					
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
1					1	
16	n Sanan Minishina dal mgalakas sinis dal nyonana un naka ana anda ayas darana	Value		nguranguralan kangangunalan kangang	No windowi Yana da waxaa da w	
ımber In		3				
imber Out		1				
'IP		1.9999	(Insufficient)		0.00	2.000

Dap Batch Process Replications:									
ition 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes			
3ottle				*					
3		Average	Half Width	Mi	nimum	Maximum			
ansfer Time		5.5167	(Correlated)	5	5.5167	5.5167			
lait Time		2.2000	0.000000000	2	.2000	2.2000			
otal Time		1.0167	0.000000000	1	.0167	1.0167			
A Time		0.4333	(Correlated)	0	.4333	0.4333			
ther Time		0.2000	(Correlated)	G	.2000	0.2000			
VA Time		0.00	0.000000000		0.00	0.00			
31	alana arangang kalang dari karan kalang dari kalang dari kalang kalang kalang kalang kalang kalang kalang kalan	Value		2000,000 - 10,000 -	-				
umber In		46,202	· · · ·						
umber Out		46,176							
/IP		30.0413	0.141582461		0.00	37.0000			

oap Batch F	Process		Replications: 1				
ition 1	Sta	art Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
s Detail Sum	imary						
per Entity							
<u>To</u>	<u>tal Time</u> 0.03	<u>VA Time</u> 0.03	<u>Wait Time</u> 0.00				
nulated Time							
	<u>/A Time</u> 118.40	<u>Wait Time</u> 0.00		azar da katera manangan yang bara katera			
	<u>imber in</u> 3,552.00	<u>Number Out</u> 3,552.00			***		112-111-11-1-11-1-1-1-1-1-1-1-1-1-1-1-1

Dap Batch Pro	Cess	na da baran kata manga kata na anga kata anga kata anga kata anga kata anga kata anga kata kata na sanga kata k			Rep	lications: 1
ition 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
)X						
per Entity		Average	Half Width	Mini	mum	Maximum
Fime Per Entity		0.03333333	(Correlated)	0.03333	3333 0	.03333333
I Time Per Entity		0.03333333	(Correlated)	0.03333	3333 0	.03333333
t Time Per Entity		0	0.000000000		0	0
nulated Time		Value				
ım VA Time		118.40				
um Wait Time		0				
,		Value				
ıber Out		3,552				
iber In		3,552				

•

128128291482077492954914914914914914914914911156914944999555999	an a	Que	eues		THE MANAGEMENT CONTRACTION OF THE STATE	June 1, 2
bap Batch I	Process				Replic	ations: 1
ition 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
Detail Sum	mary					
	<b>O</b> uouo		<u>Waiting Time</u> 0.00	na upnyna o sana o pana o pana	na na ana ana ana ana ana ana ana ana a	National Sector Of Acres Control of Sector
redients Added.	Queue		0.00			
Box.Queue			0.00			
Capper2.Queue	•		0.00			
Filler2Tank Reg			0.00			
OrderAuthorizat			92.93			
Jntil Order Comp	bleted Filler.Queue		0.50			
Jntil Order Comp	bleted.Queue		3.40			
R		yayad ya gagga kuy kuraya nami kutan kuyanka ya Karika kutan k	Number Waiting	llein der fers die der dar die die die die die verwandt e Blackender Stechender	kang mendarak permetan dan dan dan dan dan dan dan dan dan d	м а мар а аруу ат фарта са ула у су с
redients Added.	Queue		0.00			
into Box.Queue			5.43			
Box.Queue			0.00			
Capper2.Queue			0.00			
Filler2Tank Reg			0.00			
OrderAuthorizat			1.84			
	pleted Filler.Queue		0.00			
Jntil Order Comp	pleted.Queue		0.06			

oap Batch P	rocess				cations: 1
ition 1	Start Time:	0.00	Stop Time:	1,440.00 Time Units	Minutes
redients Addec	I.Queue				
3		Average	HalfWidth	Minimum	Maximum
aiting Time		0	0.000000000	0	0
31		Average	HalfWidth	Minimum	Maximum
umber Waiting		0	(Insufficient)	0	3.0000
nto Box.Queue	)				
		Average	HalfWidth	Minimum	Maximum
aiting Time		0.1833	(Correlated)	0	0.3667
37	********	Average	Half Width	Minimum	Maximum
umber Waiting		5.4270	0.031831601	0	12.0000
lox.Queue					
3		Average	HalfWidth	Minimum	Maximum
aiting Time		0	0.000000000	0	0
37		Average	HalfWidth	Minimum	Maximum
umber Waiting		0	(Insufficient)	0	0
Capper2.Queu	e				
2		Average	HalfWidth	Minimum	Maximum
aiting Time		0	0.000000000	0	0
<u>بر</u>		Average	HalfWidth	Minimum	Maximum
umber Waiting		0	(Insufficient)	0	0

pap Batch Pro			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		lications: 1
tion 1	Start Time:	0.00	Stop Time:	1,440.00 Time Unit	s: <b>Minutes</b>
		an a	ng na tang dikin katappan ng na pang katapan ng katapan na pang na pang na pang na pang na pang na pang na pan	******	
Filler2Tank Regu	ulator.Queue				
3	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Average	HalfWidth	Minimum	Maximun
aiting Time		0.00000000	(Correlated)	0	0.00000000
۶r		Average	HalfWidth	Minimum	Maximun
umber Waiting		0.00000000	(Correlated)	0	1.0000
OrderAuthorizati	on.Queue				
3	***	Average	Half Width	Minimum	Maximun
aiting Time		92.9304	(Insufficient)	0	282.44
*		Average	Half Width	Minimum	Maximun
umber Waiting		1.8380	(Insufficient)	0	6.0000
Intil Order Comp	leted Filler.Que	iue			
3		Average	HalfWidth	Minimum	Maximun
aiting Time		0.5000	(Insufficient)	0.5000	0.5000
۲	للمراوي والمراوية المراوية المراوية ومراوية والمراوية والمراوية والمراوية والمراوية والمراوية والمراوية والمراوية	Average	Half Width	Minimum	Maximun
umber Waiting		0.00451389	(Insufficient)	0	1.0000
ntil Order Comp	leted.Queue				
3		Average	HalfWidth	Minimum	Maximun
aiting Time		3.3973	(Insufficient)	3.3249	5.2081
) <b>r</b>		Average	HalfWidth	Minimum	Maximun
umber Waiting		0.06133998	(Insufficient)	0	1.0000

Page 3 of 3

tion 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
--------	-------------	------	------------	----------	-------------	---------

	Inst Util	Num Busy	Num Sched	Num Seized	Sched Util
»r2	0.49	0.49	1.00	42,639.00	0.49
Authoriz	1.00	1.00	1.00	27.00	1.00
ng	0.08	0.08	1.00	3,552.00	0.08

pap Batch F	Process		an and a subscription of the subscription of t	MANDE OMBORIE ORDE OR ALLED OF ORDER	Replicat	ions: 1
tion 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
r2 Resource						
ge		Value				
stal Number Se	zed	42,639.00				
cheduled Utiliza	tion	0.4935				
umber Schedule	ed	1.0000	(Insufficient)		1.0000	1.0000
umber Busy		0.4935	0.002669433		0	1.000
stantaneous Uti	ilization	0.4935	0.002669433		0	1.0000
Authorization						
ge		Value				N1718-1111-022750-01-02/1718-02/1718
otal Number Se	ized	27.0000				
cheduled Utiliza	tion	0.9992				
umber Schedule	ed	1.0000	(Insufficient)		1.0000	1.000
umber Busy		0.9992	(Insufficient)		0	1.000
stantaneous Ut	ilization	0.9992	(Insufficient)		0	1.000
ig Resource						
ge		Value				
stal Number Se	ized	3,552.00				
cheduled Utiliza	tion	0.08222222				
umber Schedul	ed	1.0000	(Insufficient)		1.0000	1.000
umber Busy		0.08222222	0.000495347		0	1.000
stantaneous Ut		0.08222222	0.000495347		0	1.000

ap Batch I	Process		ung generated an annual second and a second	1440	Replicat	ions: 1
tion 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
etail Summa	ıry					
ank ank	<u>Level</u> 92.04 211.42					
uantity Add	ed					
	Total Quantity Added					
nk	51606.64					
ank	57310.48					
uantity Rem	oved					
	Total Quantity Removed					
nk	51506.64					
ink	57306.64					

Dap Batch Pr	rocess	an - a ta t			Replicat	ions: 1
tion 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units;	Minutes
Tank						
3		Average	Half Width	Mir	nimum	Maximum
vel		92.0427	(Correlated)		0	100.00
I Quantity Addec	ł	Value				
stal Quantity Add		51,606.64				ng ng mangkarakan sandara ka sa Galabaran yang maka
I Quantity Remo	ved	Value		*****		1. 1000 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 - 111 -
stal Quantity Ren	noved	51,506.64				
Tank						
3		Average	Half Width	Mir	nimum	Maximum
vel		211.42	3.09650		0	500.00
I Quantity Addec	1	Value				
tal Quantity Add	led	57,310.48				
I Quantity Remo	ved	Value			251279-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	
ital Quantity Ren	noved	57,306.64				

# **APPENDIX IV** ONE FLAVOUR AND LESSER LITERS

ations:	1	Time Units:	Minutes	
		Key	Performance	Indicators
ll Entit	ies		Average	
Non-Va	lue Addeo	d Cost	0	
Other C	ost		0	
Transfe	r Cost		0	
Value A	dded Cos	st	0	
Wait Co	st		0	
Total Co	ost		0	
II Resc	ources		Average	
Busy Co	ost		0	
Idle Cos	st		0	
Usage (	Cost		0	
Total Co	ost		0	
ystem			Average	
Total Co	ost		0	

Number Out 3,6	15

ations: 1 Time Units: Minutes

# ty Area (Level 000)

#### **umulated Time**

n VA Time

II VA IIIIIO	Value	
2Station	0.00	
ocation1	0.00	
ocation2	0.00	
ocation3	0.00	
ocation4	0.00	
ocation5	1433.10	
ocation6	0.00	
itation	0.00	
2Station	0.00	
JStation	119.37	
erStation	0.00	

1600.000		
1400.000		
1200.000		Filer2Lecation (     Biler2Lecation (     Biler2Lecation2
1000.000		圖 Filler:2Location3 國 Filler:2Location4
800.000	an a	⊠ Filler2Location5
600.000		關 利根 (12)法don 圖 Laix k (12)法don
400.000 200.000		🖾 PackingStation 📓 PalletterStation
0.000		· · · · · ·

#### n NVA Time

Value	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0

#### CHERNIA MALIANEM

#### Soap Batch Process

ations: 1 Time Units: Minutes

## ty Area (Level 000)

### imulated Time

Transfer Time		
	Value	
Station	0.00	
cation1	0.00	
cation2	0.00	
cation3	0.00	
cation4	0.00	
cation5	0.00	
cation6	0.00	
ation	0.00	
Station	0.00	
Station	0.00	
rStation	0.00	
365-14 Theorem		
Wait Time	Value	
Station	0.00	
cation1	0.00	
cation2	0.00	
cation3	0.00	
cation4	0.00	
cation5	0.0000000	
cation6	0.00	
ation	0.00	
Station	0.00	
Station	7878.20	
rStation	0.00	

1 ations: Time Units: Minutes

# ty Area (Level 000)

#### **imulated** Time

1	Other	Time	
1	Other	Time	

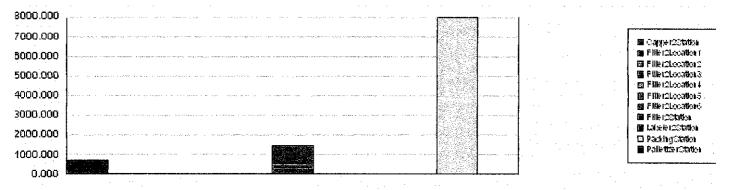
i Oulei Time	Val	lue
2Station	716.	.45
ocation1	0.0	.00
ocation2	0.0	.00
ocation3	0.0	.00
ocation4	0.0	.00
ocation5	0.0	.00
ocation6	0.0	.00
tation	0.0	.00
2Station	0.0	.00
Station	0.0	.00
erStation	0.0	.00

ations: 1 Time Units: Minutes

### ty Area (Level 000)

#### **Imulated Time**

Accum Time	
·····	Value
2Station	716.45
ocation1	0.00
ocation2	0.00
ocation3	0.00
ocation4	0.00
ocation5	1433.10
ocation6	0.00
tation	0.00
2Station	0.00
Station	7997.57
erStation	0.00



#### **imulated** Cost

ı VA Cost		
	Value	
2Station	0.00	
ocation1	0.00	
ocation2	0.00	
ocation3	0.00	
ocation4	0.00	
ocation5	0.00	
ocation6	0.00	
ation	0.00	
2Station	0.00	
Station	0.00	
rStation	0.00	

### <sup>•</sup> Soap Batch Process

ations: 1 Time Units: Minutes

# ty Area (Level 000)

#### **imulated** Cost

1 NVA Cost	
	Value
2Station	0.00
ocation1	0.00
ocation2	0.00
ocation3	0.00
ocation4	0.00
ocation5	0.00
ocation6	0.00
tation	0.00
2Station	0.00
Station	0.00
erStation	0.00
1 Transfer Cost	Value
2Station	0.00
ocation1	0.00
ocation2	0.00
ocation3	0.00
ocation4	0.00

ocation5	0.00
ocation6	0.00
tation	0.00
2Station	0.00
Station	0.00
rStation	0.00

ı Wait Cost

0.00 0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0.00	
0,00	
0.00	
0.00	
	0.00 0.00 0.00 0.00 0.00 0.00 0.00

ations: 1 Time Units: Minutes

### ty Area (Level 000)

#### **imulated** Cost

1 Other Cost	
	Value
2Station	0.00
ocation1	0.00
ocation2	0.00
ocation3	0.00
ocation4	0.00
ocation5	0.00
ocation6	0.00
tation	0.00
2Station	0.00
Station	0.00
erStation	0.00
Accum Cost	Mature
	Value
2Station	0.00
ocation1	0.00
ocation2	0.00
ocation3	0.00
ocation4	0.00
ocation5	0.00
ocation6	0.00
tation	0.00
2Station	0.00
Station	0.00
rStation	0.00

1

ations:

Time Units: Minutes

ļ

ne	Average	Half Width	Minimum Value	Maximum Value	
ottle	0.4333	0.000000000	0.4333	0.4333	
ïme	Average	Half Width	Minimum Value	Maximum Value	
ottle	0.00	0.00000000	0.00	0.00	
ïme	Average	Half Width	Minimum Value	Maximum Value	
ottle	2.2000	0.00000000	2.2000	2.2000	
er Time	Average	Half Width	Minimum Value	Maximum Value	
vttle			P = 4 & P		
, the	5.5167	(Correlated)	5.5167	5.5167	
Time	<b>5.5167</b> Average	(Correlated) Half Width	5.5167 Minimum Value	5.5167 Maximum Value	
			Minimum	Maximum	
Time	Average	Half Width	Minímum Value	Maximum Value	

Average	Half Width	Minimum Value	Maximum Value	
0.00	0.000000000	0.00	0.00	
Average	Half Width	Minimum Value	Maximum Value	
0.00	0.00000000	0.00	0.00	
Average	Half Width	Minimum Value	Maximum Value	
0.00	0.00000000	0.00	0.00	
Average	Half Width	Minimum Value	Maximum Value	
0.00	0.00000000	0.00	0.00	
Average	Half Width	Minimum Value	Maximum Value	
0.00	0.000000000	0.00	0.00	
	0.00 Average 0.00 Average 0.00 Average 0.00 Average	0.000.000000000AverageHalf Width0.000.000000000AverageHalf Width0.000.000000000AverageHalf Width0.000.000000000AverageHalf Width0.000.000000000AverageHalf Width0.000.000000000AverageHalf Width	AverageHaif WidthValue0.000.000.00AverageHalf WidthMinimum Value0.000.0000000000.00AverageHalf WidthMinimum Value0.000.0000000000.00AverageHalf WidthMinimum Value0.000.0000000000.00AverageHalf WidthMinimum Value0.000.0000000000.00AverageHalf WidthMinimum ValueAverageHalf WidthMinimum ValueAverageHalf WidthMinimum Value	AverageHalf WidthValueValue0.000.0000000000.000.00AverageHalf WidthMinimum ValueMaximum Value0.000.0000000000.000.00AverageHalf WidthMinimum ValueMaximum ValueAverageHalf WidthMinimum ValueMaximum Value0.000.000000000.000.00AverageHalf WidthMinimum ValueMaximum Value0.000.000000000.000.00AverageHalf WidthMinimum ValueValue0.000.000000000.000.00AverageHalf WidthMinimum ValueValueAverageHalf WidthMinimum ValueValue

Page 8 of 16

Soap	) Batc	h Process					
ations:	1	Time Units:	Minutes				
ost					Minimum	Maximum	
			Average	Half Width	Value	Value	
ttle			0.00	0.000000000	0.00	0.00	
ſ							
r In			Value				
		***************************************	3.0000		ta da arte dela como de la deconoción de como d		*********
ttle			46580.00				
000.000	nt to pit to pit	می اور در این ماریخ در این مراده این از این این این این این این این این این این	an	a pa ar pa a pa a pa a pa a pa a pa a p			·
000.000		e aa na maa ay ah ah a ay na ma ay na ma	a aa ah yoo ah ah ah ah ah				Ø E⊧₩(1
000.000	15 40 1. 15 0						BB Perfill South
000.000		ويعير والمراجع والمراجع مراجع والمراجع	n an a'r on ar an an or on o				
0.000		· · · · · · · · · · · · · · · · · · ·	· · · ·				
r Out							
i Out			Value				
₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	unugh (annon thu shinnels)	*****	1.0000		<b></b>		
ttle			46553.00				
			Average	Half Width	Minimum Value	Maximum Value	
			1.9999	(Insufficient)	0.00	2.0000	*******
ttle			30.2462	0.096877646	0.00	37.0000	

ations: 1 Time Units: Minutes

#### SS

### per Entity

ne Per Entity	Average	Half Width	Minimum Value	Maximum Value	
x	0.03333333	(Correlated)	0.03333333	0.03333333	
ïme Per Entity	Average	Half Width	Minimum Value	Maximum Value	
x	0.00	0.000000000	0.00	0.00	
Time Per Entity	Average	Half Width	Minimum Value	Maximum Value	
X	0.03333333	(Correlated)	0.03333333	0.03333333	η μαριστή παι τη ποριστραμική ματιστρατική του για το 2000 2000 2000 2000 2000 2000 2000 2
imulated Time					

ו VA Time		
	Value	
X	119.37	
ı Wait Time		
	Value	
X	0.00	
Accum Time		
	Value	
x	119.37	

### per Entity

st Per Entity	Average	Half Width	Minimum Value	Maximum Value	
X	0.00	0.000000000	0.00	0.00	7879 8970 000 898 998 998 998 998 998 998 998 99
lost Per Entity	Average	Half Width	Minimum Value	Maximum Value	
x	0.00	0.000000000	0.00	0.00	
Sost Per Entity	Average	Half Width	Minimum Value	Maximum Value	
X	0.00	0.000000000	0.00	0.00	
imulated Cost					

IVA Cost

×

Value

0.00

Page 10 of 16

	Time Units:	Minutes
SS	 ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	

#### **imulated** Cost

ו Wait Cost		
	Value	
x	0.00	
\ccum Cost	Value	
x	0.00	
er In	Value	
x	3581.00	
er Out	Value	
x	3581.00	

Minutes

### Soap Batch Process

#### ations: **1** Time Units:

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g Time	Average	Half Width	Minimum Value	Maximum Value	
dients Added.Queue	0.00	(Insufficient)	0.00	0.00	
to Box.Queue	0.1833	(Correlated)	0.00	0.3667	
x.Queue	0.00	0.000000000	0.00	0.00	
apper2.Queue	0.00	0.000000000	0.00	0.00	
iller2Tank or.Queue	0.00000000	(Correlated)	0.00	0.00000000	
rderAuthorization.Queue	249.17	(Insufficient)	0.00	825.50	
itil Order Completed	0.5000	(Insufficient)	0.5000	0.5000	
itil Order ted.Queue	5.2081	(Insufficient)	5.2081	5.2081	

g Cost	Average	Half Width	Minimum Value	Maximum Value	
dients Added.Queue	0.00	(Insufficient)	0.00	0.00	
o Box.Queue	0.00	0.000000000	0.00	0.00	
x.Queue	0.00	0.000000000	0.00	0.00	
apper2.Queue	0.00	0.000000000	0.00	0.00	
iller2Tank or.Queue	0.00	0.000000000	0.00	0.00	
rderAuthorization.Queue	0.00	(Insufficient)	0.00	0.00	
til Order Completed	0.00	(Insufficient)	0.00	0.00	
til Order ted.Queue	0.00	(Insufficient)	0.00	0.00	

ľ

ər Waiting	Average	Half Width	Minimum Value	Maximum Value	
dients Added.Queue	0.00	(Insufficient)	0.00	3.0000	
o Box.Queue	5.4715	0.022299052	0.00	12.0000	
x.Queue	0.00	(Insufficient)	0.00	0.00	
apper2.Queue	0.00	(Insufficient)	0.00	0.00	
ller2Tank pr.Queue	0.00000000	(Correlated)	0.00	1.0000	
rderAuthorization.Queue	2.1026	(Insufficient)	0.00	5.0000	
til Order Completed	0.00381944	(Insufficient)	0.00	1.0000	
til Order ted.Queue	0.03978408	(Insufficient)	0.00	1.0000	

1

ations:	
auona.	

Time Units:

Minutes

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taneous Utilization	Average	Half Width	Minimum Value	Maximum Value	
2 Resource	0.4975	0.001768497	0.00	1.0000	
uthorization	0.9998	(Insufficient)	0.00	1.0000	
Resource	0.08289352	0.000358490	0.00	1.0000	
er <del>B</del> usy	Average	Half Width	Minimum Value	Maximum Value	
2 Resource	0.4975	0.001768497	0.00	1.0000	
uthorization	0.9998	(Insufficient)	0.00	1.0000	
Resource	0.08289352	0.000358490	0.00	1.0000	
er Scheduled	Average	Half Width	Minimum Value	Maximum Value	
2 Resource	1.0000	(Insufficient)	1.0000	1.0000	
uthorization	1.0000	(Insufficient)	1.0000	1.0000	
Resource	1.0000	(Insufficient)	1.0000	1.0000	
uled Utilization					
	Value				
2 Resource	0.4975			****	
uthorization	0.9998				
Resource	0.08289352				

ations:	1	Time Units:	Minutes
irce			

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**Number Seized** 

2 Resource	42988.00		*****	
uthorization	12.0000			
Resource	3581.00			

5000.000		I	
0000.000			
5000.000			· · ·
0000.000	ter en		r
5000.000	Englower constraints and a contract ones and a contract ones and the second		國 Cappet은 Resource 通 QickerAuthorEattor
0000.000			<ul> <li>Packing Resource</li> </ul>
5000.000	n an		
0000.000		an a	
5000.000			
0.000			and a second

Cost		
	Value	
2 Resource	0.00	
Ithorization	0.00	
Resource	0.00	
ost		
	Value	
2 Resource	0.00	
uthorization	0.00	
Resource	0.00	
Cost		
	Value	
2 Resource	0.00	
uthorization	0.00	
Resource	0.00	

ations: 1 Time Units:

Minutes

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8

er Entities Transferring Minimum Maximum Average Half Width Value Value 2Station 4.9757 0.016971551 0.00 6.0000 ocation1 0.00 0.000000000 0.00 1.0000 1.0000 ocation2 0.00000000 0.00 2.0000 ocation3 1.0000 (Correlated) 0.00 2.0000 1.0000 (Correlated) ocation4 0.00 2.0000 ocation5 0.9999 (Correlated) 0.00 2.0000 ocation6 0.9999 (Correlated) 0.00 2.0000 0.00 (Insufficient) 0.00 0.00 tation 2Station 3.4826 0.012685319 0.00 4.0000 Station 4.9747 0.019107574 0.00 6.0000 rStation 0.2901 0.001236360 0.00 1.0000

Time Units: Minutes

#### ļe

	Average	Half Width	Minimum Value	Maximum Value	
ank	96.0279	1.16554	0.00	100.00	
ank	225.53	(Correlated)	0.00	500.00	
Juantity Added	Value				
ank	30539.04			₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	
ank	30619.58				
3620.000					
3610.000	an a				
3600.000					
3590.000	and and an and a second se			la de la des	
3580.000 ·································					<b>⊠</b> Filleit2Tauk
0570.000 an	na an a		21 1월 1월 1월 1일 1일 21 1월 1월 1일		📾 MikingTank
3560.000	e al strandisculture and some and some of a second				L
3550.000	and a sub-second product of the second s				
3540.000					
3530.000		SS la nata da brea C.	ter all a litera all factors	a an	

Juantity Removed

Value

ank 30439.04 ank 30539.04 Entities

Soap Batc	h Process				Replicat	ions: 1
ication 1	Start Ti	me: 0.00	Stop Time:	1,440.00	Time Units:	Minutes
/ Detail Sum	mary					
	NVA Time	Other Time	Total Time	Transfer Time	VA Ti	me
Bottle	0.00	0.20	1.02	5.52	0	.43
	0.00	0.20	1.02	5.52	0	.43
	NVA Cost	Other Cost	Total Cost	Transfer Cost	VA C	ost
Bottle	0.00	0.00	0.00	0.00	0	.00
1	0.00	0.00	0.00	0.00	0	.00
	Number In	Number Out				
I	3	1				
lottle	46,580	46,553				
	46,583	46,554				

Wait Time		
2.20		
2.20		
Wait Cost		
0.00		

0.00			
0.00			

Soap Batch Process						Replications: 1	
ication 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes	
ity 1							
Other		Value		enters automorphismology and a feature for the	NPG at VSVs at at 4 MARCUP source to 4 many reg		
Number In		3					
Number Out		. 1					
WIP		1.9999	(Insufficient)		0.00	2.000	

Soap Batch Pr	ocess				Replic	ations: 1
ication 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
fill Bottle			an a			
ime	ายาสมา หนุ่งงายการเงายอาสนับระ มาระเภอน งายนายน Manakah เป็น	Average	Half Width	N	linimum	Maximun
Total Time		1.0167	0.000000000		1.0167	1.0167
NVA Time		0.00	0.000000000		0.00	0.00
VA Time		0.4333	0.000000000		0.4333	0.4333
Wait Time		2.2000	0.00000000	;	2.2000	2.2000
Transfer Time		5.5167	(Correlated)		5.5167	5.5167
Other Time		0.2000	(Correlated)		0.2000	0.2000
Sost	19-19-19-19-19-19-19-19-19-19-19-19-19-1	Average	Half Width	N	linimum	Maximun
Other Cost		0.00	0.000000000		0.00	0.00
Total Cost		0.00	0.00000000		0.00	0.00
Transfer Cost		0.00	0.00000000		0.00	0.00
VA Cost		0.00	0.000000000		0.00	0.00
Wait Cost		0.00	0.000000000		0.00	0.00
NVA Cost		0.00	0.000000000	:	0.00	0.00
<u>)ther</u>		Value				
Number In		46,580				
WIP		30.2462	0.096877646		0.00	37.0000
Number Out		46,553				

Soap Batch Process						Replications: 1		
ication 1	Sti	art Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes	
ess Detail	Summary							
e per Entit	-							
Зох	<u>Total Time</u> 0.03	<u>VA Time</u> 0.03	<u>Wait Tin</u> 0.4				<b>99 - 99 - 99 - 99 - 99 - 99 - 99 - 99 </b>	
umulated	Time							
Box	<u>Total Time</u> 119.37	<u>VA Time</u> 119.37	<u>Wait Tin</u> 0.1	<u>ne</u> 00		nay (MYYYYY) I I BYBYYY (MYBERYY CHURCH I donhar yng	20 - 19 - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2	
st per Entit	y							
Box	<u>Total Cost</u> 0.00	<u>VA Cost</u> 0.00	<u>Wait Co</u> 0.1	<u>ost</u> 00			-	
umulated	Cost							
Box	<u>Total Cost</u> 0.00	<u>VA Cost</u> 0.00	<u>Wait Co</u> 0.0	<u>ost</u> 00	анан алан алан алан алан алан алан алан	TANTA Wajara Princisa pinakana kana kana kana kana kana kana ka	288, billion ann an 1999 an	
er								
Box	<u>Number In</u> 3,581.00	<u>Number Out</u> 3,581.00	7922472349944499494949494949494949494949494949	annan an ann an Arthree ann an Arthree State ann an Arthree ann an Arthree Arthree Arthree Arthree Arthree Arth		an a	nang ngga <b>1999 - 19</b> 94 ang kanalagi ng	

Soap Batch Process Replications: 1						
ication 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
Box						
me per Entity		Average	Half Width	Minir	num	Maximum
A Time Per Entity		0.03333333	(Correlated)	0.03333	<b>333 0</b> .	03333333
otal Time Per Entity		0.03333333	(Correlated)	0.03333	333 0.	03333333
Vait Time Per Entity		0	0.000000000		0	0
cumulated Time		Value				
otal Accum Time		119.37				an include and include any of the state of the
Accum VA Time		119.37				
ccum Wait Time		0				
ost per Entity		Average	Half Width	Minin	num	Maximum
Vait Cost Per Entity		0	0.000000000		0	0
A Cost Per Entity		0	0.000000000		0	0
otal Cost Per Entity		0	0.000000000		0	0
cumulated Cost		Value				
otal Accum Cost		0				
ccum Wait Cost		0				
ccum VA Cost		0				
her		Value				
lumber Out		3,581				
lumber In		3,581				

Soap Batch F		Replications: 1				
ication 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units: Minutes	

#### eue Detail Summary

ne

	Waiting Time
I Ingredients Added.Queue	0.00
ack into Box.Queue	0.18
al Box.Queue	0.00
vize Capper2.Queue	0.00
ize Filler2Tank Regulator Queue	0.00
size OrderAuthorization.Queue	249.17
ait Until Order Completed Filler.Queue	0.50
ait Until Order Completed.Queue	5.21

st

	Waiting Cost
Ingredients Added.Queue	0.00
ick into Box.Queue	0.00
al Box.Queue	0.00
ize Capper2.Queue	0.00
ize Filler2Tank Regulator.Queue	0.00
ize OrderAuthorization.Queue	0.00
ait Until Order Completed Filler.Queue	0.00
ait Until Order Completed.Queue	0.00

#### her

	Number Waiting
Ingredients Added.Queue	0.00
ick into Box.Queue	<b>5</b> .47
al Box.Queue	0.00
ize Capper2.Queue	0.00
ize Filler2Tank Regulator.Queue	0.00
ize OrderAuthorization.Queue	2.10
ait Until Order Completed Filler.Queue	0.00
ait Until Order Completed.Queue	0.04

Soap Batch F	Process		T. O. T. THE JOINT COMMEND IN TO SOLUTION IN THE SECOND	ne na zakonenye anana kana kana kana kana kana kana ka	Replications: 1
ication 1	Start Time:	0.00	Stop Time:	<b>1,440.00</b> Time	e Units: <b>Minutes</b>
ngredients Adde	d.Queue				
ïme		Average	HalfWidth	Minimum	Maximum
Waiting Time		0	(Insufficient)	0	0
Sost		Average	HalfWidth	Minimum	Maximum
Waiting Cost		0	(Insufficient)	0	0
Other		Average	Half Width	Minimum	Maximum
Number Waiting		0	(Insufficient)	0	3.0000
k into Box.Queu	9				
ime		Average	HalfWidth	Minimum	Maximum
Waiting Time		0.1833	(Correlated)	0	0.3667
;ost		Average	Half Width	Minimum	Maximum
Waiting Cost		0	0.000000000	0	0
)ther	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Average	Half Width	Minimum	Maximum
Number Waiting		5.4715	0.022299052	0	12.0000
Il Box.Queue					
ime	1999 - 1 1999 - 1 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 19	Average	Half Width	Minimum	Maximum
Waiting Time		0	0.000000000	0	0
ost		Average	Half Width	Minimum	Maximum
Waiting Cost		0	0.000000000	0	0
other		Average	HalfWidth	Minimum	Maximum
Number Waiting		0	(Insufficient)	0	0

Soap Batch P	'rocess	ainan an		Repl	ications: 1
ication 1	Start Time:	0.00	Stop Time:	1,440.00 Time Units	: Minutes
ze Capper2.Queu	e				
Time	1017011101110111011110111110111110111111	Average	Half Width	Minimum	Maximum
Waiting Time		0	0.000000000	0	o
Cost		Average	HalfWidth	Minimum	Maximun
Waiting Cost		0	0.000000000	0	0
Other		Average	HalfWidth	Minimum	Maximum
Number Waiting		0	(Insufficient)	0	0
ze Filler2Tank Re	gulator.Queue	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
ime		Average	HalfWidth	Minimum	Maximum
Waiting Time		0.00000000	(Correlated)	0	0.00000000
Cost	د ۱۹۹۷ میروند. ۱۹۹۵ میروند از میروند از میروند با این میروند با این میروند از میروند از میروند از میروند از میروند از میروند ا	Average	Half Width	Minimum	Maximum
Waiting Cost		0	0.000000000	0	0
Other		Average	Half Width	Minimum	Maximum
Number Waiting		0.00000000	(Correlated)	; <b>0</b>	1.0000
ze OrderAuthoriza	ation.Queue				
ïme	****	Average	Half Width	Minimum	Maximum
Waiting Time		249.17	(Insufficient)	0	825.50
cost	NAA AMBERTAN MERANJAIN MUsehalan Musehalan mana mushamma na musy mpa mata ay	Average	Half Width	Minimum	Maximum
Waiting Cost		0	(Insufficient)	0	0
)ther		Average	HalfWidth	Minimum	Maximum
Number Waiting		2.1026	(Insufficient)	0	5.0000

Page 3 of 4

Soap Batch Process Replications: 1							
ication 1	Start Time: <b>0</b> .00	Stop Time:	<b>1,440.00</b> Time	Units: <b>Minutes</b>			
it Until Order Comp	pleted Filler.Queue						
īme	Averag	e Half Width	Minimum	Maximum			
Waiting Time	0.500	0 (Insufficient)	0.5000	0.5000			
Cost	Averag	e Half Width	Minimum	Maximum			
Waiting Cost		0 (Insufficient)	0	0			
)ther	Averag	e Half Width	Minimum	Maximum			
Number Waiting	0.0038194	4 (Insufficient)	0	1.0000			
it Until Order Comp	leted.Queue		929 - 2 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 229 - 2				
ïme	Averag	e Half Width	Minimum	Maximum			
Waiting Time	5.208	1 (Insufficient)	5.2081	5.2081			
Cost	Averag	e Half Width	Minimum	Maximum			
Waiting Cost		) (Insufficient)	0	0			
)ther	Averag	e Half Width	Minimum	Maximum			
Number Waiting	0.0397840	3 (Insufficient)	0	1.0000			

issen die die die der die	and the second secon	ant all framework of the second s	Resource		n a state a st	1 	/lay 28, 20
Soap Batch	Replications: 1						
cation 1	Start <sup>*</sup>	Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
ource Detail S	Summary						
ge	n a ann anna an anna an anna an a	and a set of the set of the set	e en la companya en esta en es	an cara a san a san a san a sa	, see more as a constant of a strategy process		e han den weer en sen op
	Inst Util	Num Busy	Num Sched	Num Seized	Sched Util		
pper2	0.50	0.50	1.00	42,988.00	0.50		
derAuthoriz	1.00	1.00	1.00	12.00	1.00		
cking	0.08	0.08	1.00	3,581.00	0.08		
<b>t</b>	n esta se constructiva e constru		n - e , e e e e na ana ana ana	and the design of the design of the second secon	an a		
		Busy Cost	ld	le Cost	Usage Cost		
per2 Resource		0.00		0.00	0.00		
rAuthorization		0.00		0.00	0.00		
ing Resource		0.00		0.00	0.00		

R	eso	ur	ces
---	-----	----	-----

Soap Batch I			<u></u>		Replicat	10118. 1
cation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
oper2 Resource				19 19 19 19 19 19 19 19 19 19 19 19 19 1		
Jsage		Average	HalfWidth	· Minim	านทา	Maximun
Instantaneous Ut	ilization	0.4975	0.001768497		0	1.0000
Number Busy		0.4975	0.001768497		0	1.0000
Number Schedul	ed	1.0000	(Insufficient)	1.00	000	1.0000
Total Number Se	ized	42,988.00				
Scheduled Utiliza	ation	0.4975				
Sost		Value	المريكة من والمريكة المريكة الم المريكة المريكة			
Usage Cost		0				
Busy Cost		0				
Idle Cost		0				
lerAuthorization						97. Mill all Will foot and a descent spectra of the
Jsage		Value				
Total Number Se	ized	12.0000				
Instantaneous Ut	ilization	0.9998	(Insufficient)		0	1.0000
Number Busy		0.9998	(Insufficient)		0	1.0000
Scheduled Utiliza	ation	0.9998				
Number Schedul	ed	1.0000	(Insufficient)	1.00	00	1.0000
Cost		Value				
Busy Cost		0				
Idle Cost		0				
Usage Cost		0				

Soap Batch F	Process				Replicat	ions: 1
cation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
king Resource						**************************************
Jsage		Average	HalfWidth	Minii	num	Maximum
Instantaneous Uti	ilization	0.08289352	0.000358490		0	1.0000
Scheduled Utiliza	ition	0.08289352				
Total Number Se	ized	3,581.00				
Number Busy		0.08289352	0.000358490		0	1.0000
Number Schedule	ed	1.0000	(Insufficient)	1.0	000	1.0000
Cost		Value				
Idle Cost		0				
Usage Cost		0				
Busy Cost		0				

Soap Batch	Process				Replicat	ions: 1
cation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minute
CDetail Summa	ary					
el						
:r2Tank ingTank	<u>Level</u> 96.03 225.53					
ıl Quantity Add	ed	*** *********				
2Tank 1gTank	<u>Total Quantity Added</u> 30539.04 30619.58					
Il Quantity Rem	oved	a na na sana ang na na na na na na na	an anta ang ang ang ang ang ang ang ang ang an			
	Total Quantity Removed					
2Tank IgTank	30439.04 30539.04					
alam karana kara bahara kabatan kabatan yerang mana kara kara karang karang karang karang karang karang karang	n de se de la desta de la desta de la desta como esta de sus enconstante en centra de se como esta de la desta				ng da kanang	SCHOLOGICAL MORE SCHOOL

Soap Batch Proce	ess.			<u> </u>	Replicat	ions: 1
cation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
ər2Tank						
.evel		Average	Half Width	Min	imum	Maximum
Level		96.0279	1.16554		0	100.00
otal Quantity Added		Value				
Total Quantity Added		30,539.04				
otal Quantity Removed		Value				
Total Quantity Remove	t	30,439.04				
ingTank						*****
evel		Average	Half Width	Min	mum	Maximum
Level		225.53	(Correlated)		0	500.00
otal Quantity Added		Value				
Total Quantity Added		30,619.58				
otal Quantity Removed		Value				
Total Quantity Removed	1	30,539.04				

# **APPENDIX V** orders reduced by 25%

ions: 1 Time Units: Minutes

#### **Key Performance Indicators**

#### stem

umber Out

Average **3,273** 

# nulated Time

/ Area (Level 000)

/A Time	à	
	Value	
station	0.00	
ation1	0.00	
ation2	0.00	
ation3	0.00	
ation4	0.00	
ation5	1280.40	
ation6	0.00	
ion	0.00	
tation	0.00	
ation	106.70	
Station	0.00	
000.00		· · · · · · · · · · · · · · · · · · ·
000.00		Capper2Station
000.000		☐ Filler2Location1
000.00		Filler2Location3
		■ Filler2Location5
0.000	· · · · · · · · · · · · · · · · · · ·	B Filler2Station
0.000		E Labeler2Station
00,000	· · · · · · · · · · · · · · · · · · ·	PalletizerStation
0.000 L		

#### **IVA** Time

IVA TIMe	Value	
itation	0.00	
ation1	0.00	
ation2	0.00	
ation3	0.00	
ation4	0.00	
ation5	0.00	
ation6	0.00	
tion	0.00	
station	0.00	
tation	0.00	
Station	0.00	

١M

1 Minutes ions: Time Units:

# **Category Overview**

12

ions: 1 Time Units: Minutes

## / Area (Level 000)

Fransfer	Time Value	
alministration and a local statements	and an or a low of the state of the	
Station	0.00	
ation1	0.00	
ation2	0.00	
ation3	0.00	
ation4	0.00	
ation5 ation6	0.00 0.00	
tion	0.00	
Station	0.00	
tation	0.00	
Station	0.00	
Station	0.00	
Vait Tim	e	
aliferin desta de la companya de la	Value	
Station	0.00	
ation1	0.00	
ation2	0.00	
ation3	0.00	
ation4	0.00	
ation5	0.0000000	
ation6	0.00	
tion	0.00	
Station	0.00	
tation	7042.20	
Station	0.00	
<b>30.000</b> r		· · · · · · · · · · · · · · · · · · ·
000.00		₩ Capper2Station
000.000		Biller2Location1 □ Filler2Location2
000.00		B Filler2Location3
000.00		Siller2Location4
000.00		☐ Filler2Location6 ☐ Filler2Station
000.00		BackingStation     PackingStation
000.00		Sector Station
0.000	· · · · · · · · · · · · · · · · · · ·	

ions: 1 Time Units: Minutes

#### / Area (Level 000)

Other Time		
	Value	
Station	640.20	
ation1	0.00	
ation2	0.00	
ation3	0.00	
ation4	0.00	
ation5	0.00	
ation6	0.00	
tion	0.00	
Station	0.00	
tation	0.00	
Station	0.00	

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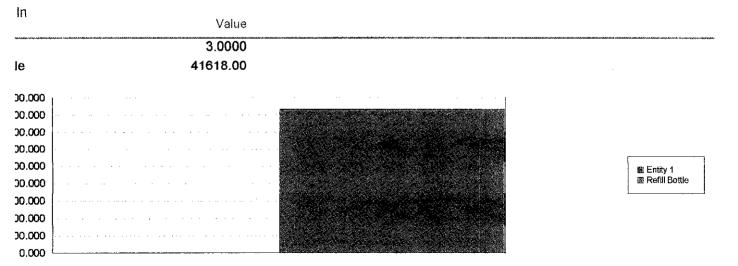
ons: 1 Time Units: Minutes

#### / Area (Level 000)

cum Tír	ne	
	Value	
tation	640.20	
ation1	0.00	
tion2	0.00	
tion3	0.00	
tion4	0.00	
tion5	1280.40	
tion6	0.00	
on	0.00	
ation	0.00	
ation	7148.90	
tation	0.00	
lation	0.00	
0.000		
0.000		Capper2Station
000.		Generation     Generation     Generation     Generation     Generation
000.		
0.000		Filler2Location4    Filler2Location5
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ons: 1 Time Units: Minutes

:	Average	Half Width	Minimum Value	Maximum Value	
le	0.4333	0.00000000	0.4333	0.4333	namenta kun anan kedin di sama kana saka kun kun kun kun kun di di di di dana kun kun kun di di di di di di did
16	Average	Half Width	Minimum Value	Maximum Value	
le	0.00	0.00000000	0.00	0.00	
ıe	Average	Half Width	Minimum Value	Maximum Value	
le	2.2000	0.000000001	2.2000	2.2000	
Time	Average	Half Width	Minimum Value	Maximum Value	
le	5.5167	(Correlated)	5.5167	5.5167	997 man 1997 1997 1997 1997 1997 1997 1997 199
le me	5.5167 Average	<b>(Correlated)</b> Half Width			
		. ,	5.5167 Minimum	<b>5.5167</b> Maximum	
me	Average	Half Width	<b>5.5167</b> Minimum Value	<b>5.5167</b> Maximum Value	



			Cat	edentrolutura arbeitzaneradouratziendouen	June 3, 2009		
Soaj	o Bat	ch Process			andara and a substantia and a substantia and a	2011 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 1012 - 2012 - 10	
ons:	1	Time Units:	Minutes	i			
Out			Value				
le			1.0000 11613.00		840 <b>m</b> arria en la constanción de la constanción (norma, societa).		
			Average	Half Width	Minimum Value	Maximum Value	
Series	*********	and an an of the stand of the stan	1.9999	(Insufficient)	0.00	2.0000	na na manana mangkan ka mangkan kanangkan kanangkan kanangkan kanangkan sa panangkan kanangkan kanangkan kanang

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le

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# per Entity

Per Entity	Average	Half Width	Minimum Value	Maximum Value	
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e Per Entity	Average	Half Width	Minimum Value	Maximum Value	
an a	0.00	0.000000000	0.00	0.00	na n
ne Per Entity	Áverage	Half Width	Minimum Value	Maximum Value	
	0.03333333	(Correlated)	0.03333333	0.033333333	
nulated Time					
/A Time	Value				
######################################	106.70	&#####################################</td><td><u>na spera d</u>iva di kasa na kasa na kasa na kasa kasa kasa</td><td>n prendy dodo werd y sein Walt All All All a fra proposition symp</td><td>an na sana ana ang ang ang ang ang ang ang ang</td></tr><tr><td>Vait Time</td><td>Value</td><td></td><td></td><td></td><td></td></tr><tr><td><b>BAREAREAREAREAREAREAREAREAREAREAREAREAREA</b></td><td>0.00</td><td>NOVY TO YOUR STOLES OF THE STOLES OF THE STOLES AND STOLES</td><td></td><td>and and all control of the transmission to the transmission of the</td><td>MILLIANSKI, K</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>In</td><td>Value</td><td></td><td></td><td></td><td></td></tr><tr><td>BL GLERNETH STEREELINGER OF GUILDINGS CHARTYLES CHARTS AGGEL</td><td>3201.00</td><td>95-54/9656-69696-9696-9696-9696-9696-9696-969</td><td>unnun ang Pérjénékésénékésékésékésékésékésékésékésékés</td><td>na cur inn an annan anna y bhffire fachair ann annan annan</td><td>ntarakan panjaran dese kongenan ana kanan kan</td></tr><tr><td>Out</td><td>Value</td><td></td><td></td><td></td><td></td></tr><tr><td>MA-QUEEZAANNA),</td><td>3201.00</td><td>Na 1984 kalo manda kalo da kana na mangapata ya manga ya penangga ya kana penang</td><td>949999796<sup>27609</sup>6094796096966966969696969699699999999999</td><td>9779-987928-8834-86-44-65 PARITANIAN PARITANI</td><td>***********************************</td></tr></tbody></table>			

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#### Soap Batch Process

1 Time Units: Minutes ions:

Time Minimum Maximum Half Width Average Value Value (Insufficient) ients Added.Queue 0.00 0.00 0.00 0.1833 (Correlated) 0.3667 Box.Queue 0.00 0.000000000 Queue 0.00 0.00 0.00 0.00 0.000000000 0.00 0.00 pper2.Queue 0.00000000 0.00000000 er2Tank (Correlated) 0.00 Queue 163.79 (Insufficient) 0.00 289.13 lerAuthorization.Queue **Order Completed** 0.5000 (Insufficient) 0.5000 0.5000 ue (Insufficient) Order 5.2081 5.2081 5.2081 d.Queue

Waiting	Average	Half Width	Minimum Value	Maximum Value	
ients Added.Queue	0.00	(Insufficient)	0.00	3.0000	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
Box.Queue	4.8904	(Correlated)	0.00	12.0000	
Queue	0.00	(Insufficient)	0.00	0.00	
oper2.Queue	0.00	(Insufficient)	0.00	0.00	
∋r2Tank ∵Queue	0.00000000	(Correlated)	0.00	1.0000	
erAuthorization.Queue	2.7299	(Insufficient)	0.00	6.0000	
Order Completed	0.00208333	(Insufficient)	0.00	1.0000	
Order d.Queue	0.08680163	(Insufficient)	0.00	1.0000	

1 Minutes ions: Time Units:

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	alennelaiten kaiseen kaise				
b P					
neous Utilization	Average	Half Width	Minimum Value	Maximum Value	
Resource	0.4446	(Correlated)	0.00	1.0000	ni kaini misana mariada da aka dan barakan kan kan kan kan kan kan kan kan kan
norization	0.8987	(Insufficient)	0.00	1.0000	
Resource	0.07409722	(Correlated)	0.00	1.0000	
Busy	Average	Half Width	Minimum Value	Maximum Value	
Resource	0.4446	(Correlated)	0.00	1.0000	₩₩₩₩₽₩₽₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
norization	0.8987	(Insufficient)	0.00	1.0000	
Resource	0.07409722	(Correlated)	0.00	1.0000	
			<b>u</b>		

Scheduled	Average	Half Width	Minimum Value	Maximum Value	
Resource	1.0000	(Insufficient)	1.0000	1.0000	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
norization	1.0000	(Insufficient)	1.0000	1.0000	
Resource	1.0000	(Insufficient)	1.0000	1.0000	

ed Utilization		
	Value	
Resource	0.4446	
norization	0.8987	
lesource	0.07409722	
1.000		
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0.800	
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ions:	1	Time Units:	Minutes

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Entities Transferring	Average	Half Width	Minimum Value	Maximum Value
Station	4.4458	(Correlated)	0.00	6.0000
ation1	0.00	0.000000000	0.00	1.0000
ation2	1.0000	0.000000000	0.00	2.0000
ation3	1.0000	(Correlated)	0.00	2.0000
ation4	1.0000	(Correlated)	0.00	2.0000
ation5	0.9999	(Correlated)	0.00	2.0000
ation6	0.9999	(Correlated)	0.00	2.0000
tion	0.00	(Insufficient)	0.00	0.00
3tation	3.1121	(Correlated)	0.00	4.0000
tation	4.4458	(Correlated)	0.00	6.0000
Station	0.2593	(Correlated)	0.00	1.0000

☑ Capper2 Resource
 ☑ OrderAuthorization
 □ Packing Resource

# **Category Overview**

#### June 3, 2009

Soap	Batch Proces	S				
ions:	1 Time Units:	Minutes				
\$						
		Average	Half Width	Minimum Value	Maximum Value	
ık	gen soar og de en de sen oer veren weerde en de sen de een de eerste kerken kerken in de eerste en de eerste de	84.3731	(Correlated)	0.00	100.00	na na manana manana manana mana na manana na manana
٦k		193.29	(Correlated)	0.00	500.00	
iantity	Added	Value				
ık	na da menderine dar wei des her i lander den den den de	28995.70	***************************************	Alle Salahan Manakara ( Anakara	EN/2314-15744EE1E75748948-E9443917-EA82518-39443-B-151348-39-34	\$799.4 \$199.5 \$199.4 \$199.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6 \$29.6
٦k		36195.70				
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00.000	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • •				₩ Filler2Tank
00.000						MixingTank
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iantity	Removed	1 ( - )				
. Le	INTERNET IN THE INTERNET OF THE INTERNET.	Value 28995.70	av.11640, UM014/151614014000-0048/16480, ID18860-01480480-0148	9576424242449494949499499494949494949494949	1001101001anoin1110000aneses 60000000000000000000000000000000000	**************************************
ık ık		28995.70 36195.70				
ιN		50135.20				
00.000 00.000			· · · · · · · · · · · · · · · · · · ·			



₩ Filler2Tank ⊠ MixingTank

Soap Bate	ch Process	2002 - 2002	**************************************	Na Maria a Kunin Tutaka A Jahar waka kao manifasi a Maria a Maria a Maria a manazarta a f	Replications: 1	3187=5460
cation 1	Start Tir	me: 0.00	Stop Time:	1,440.00	Time Units: Minutes	
Detail Sun	nmary					
	NVA Time	Other Time	Total Time	Transfer Time	VA Time	
ttle	0.00	0.20	1.02	5.52	0.43	
	0.00	0.20	1.02	5.52	0.43	
	Number In	Number Out				~
	3	1				
ttle	41,618	41,613				
	41,621	41,614				

Vait Time

2.20

2.20

enternet source and the second se	Entities				an the first of th	June 3, 2009
Soap Batch	Process		********	JP-2-076-07071-04/202023-07000-07-34 aux 10/08080	Replica	ations: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
y 1						
Jer	<b>ਗ਼ਸ਼ਫ਼੶ਸ਼ਸ਼ਸ਼ੑਗ਼ਗ਼ਸ਼ਫ਼੶ਸ਼ਫ਼੶ਸ਼ਫ਼ਜ਼ਫ਼ਜ਼ਫ਼ਜ਼ਫ਼ਫ਼ਫ਼ਫ਼ਜ਼ਫ਼ਫ਼ਫ਼ਜ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼ਫ਼</b>	Value	8044480046481418914918-10444949244-10544951445144514451	and and a state of the	411511-1411-1678-1411-168-1411-141-141-141-141-141-141-141-1	ROUMING ON CONTRACTOR OF THE
Number In		3				
Number Out		1				
MP		1.9999	(Insufficient)	)	0.00	2.0000

Soap Batch P	Replic	ations: 1			
cation 1	Start Time:	0.00	Stop Time:	1,440.00 Time Units	Minutes
Bottle			an aithean a chann a fea ann an an an an bhaile an an ann an ann an ann ann ann ann an		non er enst en en son son son son son son son son son so
<u>1e</u>	MININA Y KANTIN DI KARIBARKAN TI MANANJARI KABINA DI MININA MININA MININA MININA MININA MININA MININA MININA MI	Average	Half Width	Minimum	Maximum
ransfer Time		5.5167	(Correlated)	5.5167	5.5167
Nait Time		2.2000	0.000000001	2.2000	2.2000
「otal Time		1.0167	0.00000000	1.0167	1.0167
/A Time		0.4333	0.00000000	0.4333	0.4333
Other Time		0.2000	(Correlated)	0.2000	0.2000
IVA Time		0.00	0.000000000	0.00	0.00
<b>J</b> 6L	19-19-19-19-19-19-19-19-19-19-19-19-19-1	Value	an para amin'ny fanisa dia mampina amin'ny fanisa amin'ny fanisa amin'ny fanisa amin'ny fanisa dia mana amin'ny	<b>1999 ISAN 1999 INAN 1999 INAN</b>	
lumber in		41,618			
Jumber Out		41,613			
MP		27.5624	(Correlated)	0.00	37.0000

Soap Batch Process Replications: 1										
cation 1	Sta	art Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes			
ss Detail	Summary									
per Entity	/									
X	<u>Total Time</u> 0.03	<u>VA Time</u> 0.03	<u>Wait Time</u> 0.00				,4004/,400000,0220,0004/200,4014			
mulated 1	lime									
×	<u>VA Time</u> 106.70	<u>Wait Time</u> 0.00		na n	, Alanga ang ang ang ang ang ang ang ang ang	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	201 1010307751760200034 500034 5000			
r										
X	<u>Number In</u> 3,201.00	<u>Number Out</u> 3,201.00	84.440%8444944944944948		Gan an a	490000100000000000000000000000000000000	-hu <sup>m</sup> -dhalanain <b>ei</b> ainisean an bhann			

1

of

Soap Batch Process Replications: 1						
cation 1	Start Time:	0.00	Stop Time:	1,440.00	Time	Units: <b>Minutes</b>
3ox			an in the second se			
e per Entity	Ave	rage	Half Width	Minir	num	Maximum
Time Per Entity	0.03333	333	(Correlated)	0.03333	333	0.03333333
tal Time Per Entity	0.03333	333	(Correlated)	0.03333	333	0.03333333
ait Time Per Entity		0	0.00000000		0	0
umulated Time	V	alue				
cum VA Time	10€	6.70				
cum Wait Time		0				
ər	V	alue				
mber Out	3,	201				
mber In	3,	201				

Soap Batch Process Replications: 1								
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes		
ie Detail Sun	imary							
	Maganalariangi wakata Ukarana (1996/97/2021/s/2006/19/-2016/19/-2016/19/-2016/19/-2016/19/-2016/19/-2016/19/-2	10001000000000000000000000000000000000		- -	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
			Waiting Time					
ngredients Added			0.00					
k into Box.Queue			0.18					
Box.Queue			0.00					
:e Capper2.Queue :e Filler2Tank Regulator.Queue			- 0.00 0.00					
e OrderAuthoriza			163.79					
t Until Order Completed Filler.Queue			0.50					
Until Order Com	-		5.21					
9 <b>1</b>	an ana sa	AN COMPANY AND AN		Dirizzini Malaya ng mangang man	**##\$\$\$\#110000\$#\$\$\$######################	un muutum alan anna ann an an an ann an ann an an an		
			Number Waiting					
ngredients Added	Queue		0.00					
k into Box.Queue			4.89					
Box.Queue	_		0.00					
e Capper2.Queu			0.00					
e Filler2Tank Reg e OrderAuthoriza	-		0.00 2.73					
			2.73					
t Until Order Completed Filler.Queue t Until Order Completed.Queue			0.00					

1M		Que	2008		June 3, 200
Soap Batch	Process			Replic	cations: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00 Time Units	: Minutes
gredients Adde	ed.Queue				
.1e	2149931201930112830112239412312039412312039409419494044949404494949494494494494494494494	Average	Half Width	Minimum	Maximum
Vaiting Time		0	(Insufficient)	0	0
Jer		Average	Half Width	Minimum	Maximum
Number Waiting		0	(Insufficient)	0	3.0000
; into Box.Quer	10			a a se a	
ıe	14 10 14 10 14 10 14 10 14 10 14 10 14 10 14 10 14 10 14 10 14 14 14 14 14 14 14 14 14 14 14 14 14	Average	Half Width	Minimum	Maximum
Vaiting Time		0.1833	(Correlated)	0	0.3667
ler	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	Average	Half Width	Minimum	Maximum
lumber Waiting		4.8904	(Correlated)	0	12.0000
Box.Queue					
<u>1</u> e	218228018949364964804930999696969696969696969969969969996999999	Average	Half Width	Minimum	Maximum
Vaiting Time		0	0.000000000	0	0
ler		Average	Half Width	Minimum	Maximum
lumber Waiting		0	(Insufficient)	0	0
∋ Capper2.Que	eue				
16	MMENummaharasa mananananan menangkan yang burupu pulanya pulanya pulanya pulanya pulanya pulanya pulanya pulany	Average	Half Width	Minimum	Maximum
Vaiting Time		0	0.00000000	0	0
ler	angasannan ayaasa maaaabiin waxaa iyoo ayaa ayaa ayaa ayaa ayaa ayaa ay	Average	Half Width	Minimum	Maximum
lumber Waiting		0	(Insufficient)	0	0

ilename: C:\Program Files\Rockwell Software\Arena 10.0\Examples\FlowProcess\Supe Page 2 of 3

۳M		Que	eues	anan yana kana kana kana kana kana kana	June 3, 200
Soap Batch F	Process			Rej	olications: 1
cation 1	Start Time:	0.00	Stop Time:	1,440.00 Time Un	its: <b>Minutes</b>
e Filler2Tank Re	gulator.Queue				
ne		Average	Half Width	Minimum	Maximum
Naiting Time		0.00000000	(Correlated)	0	0.00000000
her	2011-11-11-11-11-11-11-11-11-11-11-11-11-	Average	Half Width	Minimum	Maximum
Number Waiting		0.00000000	(Correlated)	0	1.0000
e OrderAuthoriza	ation.Queue	*****	1999 1999 1999 1999 1999 1999 1999 199		
ne	228843142867517618867947676284749676243476767777777	Average	Half Width	Minimum	Maximum
Waiting Time		163.79	(Insufficient)	0	289.13
her	429031/6980/6990/6990/6990/690/690/690/690/690/690	Average	Half Width	Minimum	Maximum
Number Waiting		2.7299	(Insufficient)	0	6.0000
Until Order Con	npleted Filler.Qu	leue		annin teana sanaka kan kasa sara kan kan kan kan kan kan kan kan kan ka	
ne		Average	Half Width	Minimum	Maximum
Waiting Time		0.5000	(Insufficient)	0.5000	0.5000
her	01300/101407-10130-101491-10 306092217111/1017039099717979	Average	Half Width	Minimum	Maximum
Number Waiting		0.00208333	(Insufficient)	0	1.0000
Until Order Com	npleted.Queue				
ne		Average	Half Width	Minimum	Maximum
Waiting Time		5.2081	(Insufficient)	5.2081	5.2081
her	MGSANARJAAJAMISHIRAR SI DIMARANIN AN	Average	Half Width	Minimum	Maximum
Number Waiting		0.08680163	(Insufficient)	0	1.0000

Soap Batc	h Process					Replicati	ons: 1
ation 1	Start 1	Fime:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
ırce Detail	Summary						
3	9979 11 - Solga Mallon Science Science Science (1997) 1897 1997 1997	*****		1904-1914-194-194-1914-1914-1914-194-194-19	10-10-10-10-10-10-10-10-10-10-10-10-10-1	na na mana any kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodim-kaodi	New York Strategy (1992) and State
	Inst Util	<u>Num Busy</u>	Num Sched	Num Seized	Sched U	<u>ttil</u>	
per2	0.44	0.44	1.00	38,412.00		-	
erAuthoriz	0.90 0.07	0.90 0.07	1.00 1.00	24.00 3,201.00			

		NCSUII	na se			une 3, 20
Soap Batch Pr	ocess				Replicati	ons: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
per2 Resource					allah dalam menangkan persona dalam da National dalam d	handbearana na an
age	813113112112113111111111111111111111111	Value	#0.050/08/06/06/06/06/06/06/06/06/06/06/06/06/06/	Wojcodzie ostanie od stanie od s	JR104464466451483168652020108276279210007620;01149959494	1033652/2010200000000000000000000000000000000
otal Number Seize	d	38,412.00				
Scheduled Utilizatio	n	0.4446				
Number Scheduled		1.0000	(Insufficient)		1.0000	1.0000
lumber Busy		0.4446	(Correlated)		0	1.0000
nstantaneous Utiliz	ation	0.4446	(Correlated)		0	1.0000
rAuthorization						
age	904 the fastation has been conversed as the conversion of the conv	Value	namatan kacamatan karang karang Namari kata karina sa kananan sa tanan sa karana karang karang karang karang ka	<b>~~~</b>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	8, <sup>3,4</sup> 44,45,614,855,61,194,956,438,194,194,1
otal Number Seize	d	24.0000				
Scheduled Utilizatio	n	0.8987				
lumber Scheduled		1.0000	(Insufficient)		1.0000	1.0000
lumber Busy		0.8987	(Insufficient)		0	1.0000
nstantaneous Utiliz	ation	0.8987	(Insufficient)		0	1.0000
ing Resource						
3 <u>0</u> 6	10140/0112/0019 0000000000000000000000000000000000	Value				
otal Number Seize	d	3,201.00				·····
Scheduled Utilizatio	n	0.07409722				
lumber Scheduled		1.0000	(Insufficient)		1.0000	1.0000
lumber Busy		0.07409722	(Correlated)		0	1.0000
nstantaneous Utiliz	ation	0.07409722	(Correlated)		0	1.0000

M 	an na analan ang ang ang ang ang ang ang ang ang a	Tanl	1)	and the state of the second	June 3, 2	
Soap Batch	n Process				Replications: 1	in i no -
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units: Minute	s
Detail Sumn	nary					
Tank ITank	<u>Level</u> 84.37 193.29				9900 800 41 1990 1990 1990 1990 1990 1990 1990	
Quantity Ad	ded			*****	10090000 0000000 0000000000000000000000	
	Total Quantity Added					
ſank Tank	28995.70 36195.70					
Quantity Re	moved					
	Total Quantity Removed					
<sup>r</sup> ank Tank	28995.70 36195.70					
	an de grand trade en general an en de estade e provinsion mar a constructiva de la mar a constructiva d'al 2010					

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## Tanks

Soap Batch Pro	Cess				Replicati	ons: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
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/6		Average	Half Width	Mir	nimum	Maximum
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al Quantity Added		Value				
otal Quantity Added		28,995.70				
al Quantity Removed	1	Value	Manuschlebersehteterteten Zuwischnetzum zum beitenteten sone		starpanessanyyay 1000 asa enseranapia	New York States and a second secon
otal Quantity Remov	ed	28,995.70				
gTank						
rel		Average	Half Width	Mir	imum	Maximum
evel		193.29	(Correlated)		0	500.00
al Quantity Added		Value		11 11 11 11 11 11 11 11 11 11 11 11 11	1999 - 1991 - 1991 - 1991 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 -	
otal Quantity Added		36,195.70				
al Quantity Removed	1	Value	₩₩₩ <b>₩₽₽₽₩</b> ₩₩₩₩₩₽₽₩₩₽₽₩₽₽₩₽₽₩₩₩₩₩₩₩₩₩₩₩₩			
otal Quantity Remov	ed	36,195.70		·		

# APPENDIX VI ORDERS REDUCED BY 50%

ons: 1 Time Units: Minutes

## Key Performance Indicators

#### ;tem

umber Out

Average 1,825

ons: 1 Time Units: Minutes

## Area (Level 000)

#### **ulated** Time

'A Time			
<i><i>y</i> c i uno</i>	Value		
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tion2	0.00		
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tion5	710.80		
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on	0.00		
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tion	59,2333		
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.000			
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.000			Filler2Location 1 Filler2Location2
.000	···· · · · · · · · · ·	Maria	Filler2Location3     Filler2Location4
.000			☑ Filler2Location5
.000			☐ Filler2Location6
0.000			Labeler2Station
n <b>on</b> o			PalletizerStation

#### VA Time

0.000 0.000

IVA TIME	Value	
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ation2	0.00	
ation3	0.00	
ation4	0.00	
ation5	0.00	
ation6	0.00	
ion	0.00	
tation	0.00	
ation	0.00	
Station	0.00	

ions: 1 Time Units: Minutes

#### / Area (Level 000)

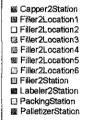
ransfer Time	Value	
Station	0.00	
ation1	0.00	
ation2	0.00	
ation3	0.00 0.00	
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tion	0.00	
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Station	0.00	
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station	0.00	
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ation2	0.00	
ation3	0.00	
ation4	0.00	
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ation6	0.00	
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lation	3909.40	
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#### / Area (Level 000)

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tation	0.00		
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ions:

1

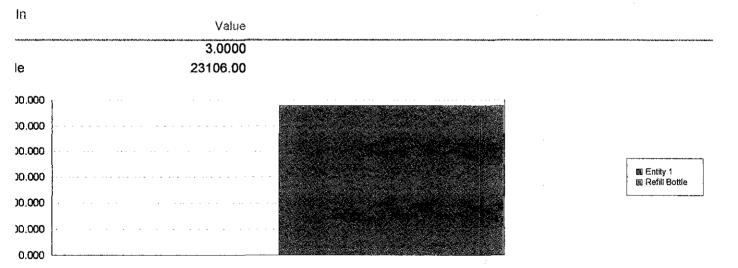
ìM

Soap Batch Process

 *******	<b></b>	Caf de Stalander de Stalander database en se	

Minutes

;	Average	Half Width	Minimum Value	Maximum Value	
le	0.4333	0.000000000	0.4333	0.4333	na man yang mula dalamatan mula mula nya ga maga alay kata da
те	Average	Half Width	Minimum Value	Maximum Value	
	0.00	0.00000000	0.00	0.00	nan balangé log mgalan lag ngga ngalan ngga kapag ala ng kapag balang ng balang kapag balang kapag ng kapag ng
<i>1</i> e	Average	Half Width	Minimum Value	Maximum Value	
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			3.4:	Maximum	
Time	Average	Half Width	Minimum Value	Value	
lime le	Average 5.5167	Half Width (Correlated)			9999 09809 000 000 000 000 000 000 000 0
	No. of the local distance of the local dista		Value	Value	494994000044400400400400400400400000000
le	5.5167	(Correlated)	Value 5.5167 Minimum	Value 5.5167 Maximum	
le me	<b>5.5167</b> Average	<b>(Correlated)</b> Half Width	Value 5.5167 Minimum Value	Value 5.5167 Maximum Value	



#### **Soap Batch Process**

ons: 1 Time Units: Minutes

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				IN THE OWNER OF THE	an a
	1.0000				
le	23101.00				
			Minimum	Maximum	
	Average	Half Width	Value	Value	
	1.9999	(Insufficient)	0.00	2.0000	anna anna ann ann ann ann ann ann ann a
e	17.5252	(Correlated)	0.00	37.0000	



### Soap Batch Process

ons: 1 Time Units: Minutes

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### er Entity

Per Entity	Average	Half Width	Minimum Value	Maximum Value	
	0.03333333	(Correlated)	0.03333333	0.03333333	######################################
e Per Entity	Average	Half Width	Minimum Value	Maximum Value	
ланалан калан к	0.00	0.000000000	0.00	0.00	มมามหมองมมายมายมายมายาง 14 M9734674767677979797979797979797979797979797
ne Per Entity	Average	Half Width	Minimum Value	Maximum Value	
	0.03333333	(Correlated)	0.03333333	0.03333333	###\$##################################
nulated Time					
'A Time	Value				
MARY THE CARACTERISTIC CONTRACTOR C	59.2333	#http://www.analysicalizedia.com/analysicalizedia.com/analysicalizedia.com/analysicalizedia.com/analysicalizedi	KANTEREN ELITERADURA KANTERIKA DATA KALA JUANA	***	\$
Vait Time	Value				
REVEN GRANT VERTICAL AL AL ANTALAN ANNAL AN GUTAL MALANNAL MU AN A ANNAL ANNAL ANNAL ANNAL ANNAL ANNAL ANNAL A	0.00	THE AND THE OFFICE AND AND ADDRESS AND ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS	######################################	nanan na taana taan taalaa ka k	NNN-1-91.09-93109728-9309-78099308185625625252524-4-9-9-4409-4-9-9408104-9-9-93125252525
In	Value				
in the subject of the	1777.00	94-67-64-67-77-47-67-685-73-685-55-697-677-6786783-665-665-665-6678	nashinan kana kana kana kana kana kana kana	#R&R&A/\->++N&A/#2440#22420#274294	анаан маларындар арау карау карау карау каралар каралар каралар каралар каралар каралар каралар каралар каралар
Out	Value				
JA TATATALTA, TALENTIKAN MEMBANGKAN KELIPALAN CONSUMER, ON JAKATAN KANANAN KANANAN KANANAN KANANAN KANANAN KANA	1777.00	na na mining ng kana katang kanang	MARANG GEOMORY (A ANALY IN THE AN	and de frank fan de frank fan de geleger frank fan de frank	аминикиминикиминикиминикиминики карын как карырда кануунунди унуусында каракалары каракалда каракалда каракалда

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Category	<b>Overview</b>
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# Soap Batch Process

Minutes 1 Time Units: ons:

Fime	Average	Half Width	Minimum Value	Maximum Value	
ents Added.Queue	0.00	(Insufficient)	0.00	0.00	ĨĨġŎŶġŎŎŎţġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎġŎ
Box.Queue	0.1833	(Correlated)	0.00	0.3667	
Queue	0.00	0.000000000	0.00	0.00	
per2.Queue	0.00	0.000000000	0.00	0.00	
⊧r2Tank .Queue	0.00000000	(Correlated)	0.00	0.00000000	
erAuthorization.Queue	116.63	(Insufficient)	0.00	268.74	
Order Completed	0.5000	(Insufficient)	0.5000	0.5000	
Order J.Queue	5.2081	(Insufficient)	5.2081	5.2081	

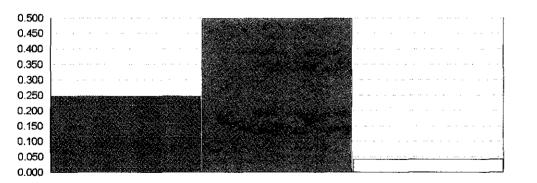
Waiting	Average	Half Width	Minimum Value	Maximum Value	
ents Added.Queue	0.00	(Insufficient)	0.00	3.0000	δηγήστολογιούσευταλολογιστορομούσεια ματογραφική καλιογολοποιοτολογιστορογιατικού στο συγγαγιστικού συγγαριγγά Το προσφοριατικού στο προσφοριατικού στο προσφοριατικού στο προσφοριατικού στο προσφοριατικού στο προσφοριατικού
Box.Queue	2.7149	(Correlated)	0.00	12.0000	
Jueue	0.00	(Insufficient)	0.00	0.00	
per2.Queue	0.00	(Insufficient)	0.00	0.00	
r2Tank Queue	0.00000000	(Correlated)	0.00	1.0000	
erAuthorization.Queue	1.2958	(Insufficient)	0.00	6.0000	
Order Completed	0.00104167	(Insufficient)	0.00	1.0000	
Order I.Queue	0.05786775	(Insufficient)	0.00	1.0000	

# Soap Batch Process

ons: 1 Time Units: Minutes

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neous Utilization	Average	Half Width	Minimum Value	Maximum Value	
Resource	0.2468	(Correlated)	0.00	1.0000	anna a' Gigenheidh a chaitheantacan mar ann an an an ann an ann an ann an an an
orization	0.4975	(Insufficient)	0.00	1.0000	
lesource	0.04113426	(Correlated)	0.00	1.0000	
Busy	Average	Half Width	Minimum Value	Maximum Value	
Resource	0.2468	(Correlated)	0.00	1.0000	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
orization	0.4975	(Insufficient)	0.00	1.0000	
lesource	0.04113426	(Correlated)	0.00	1.0000	
Scheduled	Average	Half Width	Minimum Value	Maximum Value	
Resource	1.0000	(Insufficient)	1.0000	1.0000	ан ундамуул талбан алталан ат улуун ууурдун ууул аталуу куралан улуул аталуу куралан улуу ууул ууул ууул ууул у
orization	1.0000	(Insufficient)	1.0000	1.0000	
esource	1.0000	(Insufficient)	1.0000	1.0000	
ed Utilization	Value				
Resource	0.2468	Ling/	######################################		αα. υπο ματιγγική ήγη φάλη ή γληνη ήτα ματιγγικά τη Χρασταραβαια ματαγγική γρηγορη. Οι την πάλου πολογο τη ματ Τ
orization	0.4975				
esource	0.04113426				



2 Capper2 Resource
 2 OrderAuthorization
 □ Packing Resource

# **Category Overview**

#### June 3, 2009

# Soap Batch Process

ons:	1	Time Units:	Minutes

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mber Seized

Resource	21324.00	Сентенний маладания и на продага и Продага и на продага и на продага Продага и на продага	www.confidenting.com
orization	16.0000		
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Entities Transferring	Average	Half Width	Minimum Value	Maximum Value	
tation	2.4681	(Correlated)	0.00	6.0000	₩₩₩₩₩₽₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
ation1	0.00	0.000000000	0.00	1.0000	
ation2	1.0000	0.000000000	0.00	2.0000	
ation3	1.0000	(Correlated)	0.00	2.0000	
ation4	1.0000	(Correlated)	0.00	2.0000	
ation5	0.9999	(Correlated)	0.00	2.0000	
ation6	0.9999	(Correlated)	0.00	2.0000	
ion	0.00	(Insufficient)	0.00	0.00	
tation	1.7276	(Correlated)	0.00	4.0000	
ation	2.4681	(Correlated)	0.00	6.0000	
Station	0.1440	(Correlated)	0.00	1.0000	

### **Category Overview**

Half Width

(Correlated)

(Correlated)

June 3, 2009

### Soap Batch Process

ons: 1 Time Units: Minutes

Average

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anaty Removed	Value		
k	16397.39	๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚	\$409° 102600 0.000
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Soap Bat	tch Process				Replications: 1
ation 1	Start Tir	me: 0.00	Stop Time:	1,440.00	Time Units: Minutes
Detail Su	nmary				
	NVA Time	Other Time	Total Time	Transfer Time	VA Time
ttle	0.00	0.20	1.02	5.52	0.43
	0.00	0.20	1.02	5.52	0.43
MALE TO LET AN A MALE AND A MALE A	Number in	Number Out			
	3	1			
tle	23,106	23,101			
	23,109	23,102			

Vait Time

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Soap Batch	Process				Replica	ations: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
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)er	ningen fal Malandadan manana antisa sa sa da ang sa	Value	<b></b>	11611111-111111-1111-111-111-111-111-11	241393374111-0141-01-11-11-11-11-11-11-11-11-11-11-11-11	nalmandelandelender
lumber In		3				
lumber Out		1				
VIP		1.9999	(Insufficient)		0.00	2.0000

June	З,	2009
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ioap Batch P	rocess				Replica	tions: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
Bottle						
:e	landarya'n brokh makeri falaka sanan anan aran aran aran aran aran ar	Average	Half Width	Mir	nimum	Maximum
ransfer Time		5.5167	(Correlated)	5	.5167	5.5167
vait Time		2.2000	0.00000000	2	.2000	2.2000
otal Time		1.0167	0.00000000	1	.0167	1.0167
A Time		0.4333	0.00000000	0	.4333	0.4333
ther Time		0.2000	(Correlated)	0	.2000	0.2000
VA Time		0.00	0.000000000		0.00	0.00
er		Value	<b>ຌຑໟຆຉຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎຎ</b>	1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 - 1917 -	2011 2014 2017 2019 10 2017 2010 2017 2010 2017 2010 2017 2010 2017 2010 2017 2010 2017 2010 2017 2010 2017 201	የሰላት በፊዲዮላ የዕቀታዊ መታሪካ የሰላት የሰላት የሰላት የሰላት የሰላት የሰላት የሰላት የሰላት
umber in		23,106				
umber Out		23,101				
ЛР		17.5252	(Correlated)		0.00	37.0000

Soap Ba	tch Proces	SS				Replic	cations: 1
ation 1	Sta	art Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
ss Detail	Summary						
per Entit	у						
X	<u>Total Time</u> 0.03	<u>VA Time</u> 0.03	<u>Wait Ti</u> 0.	<u>me</u> .00	anas na		
mulated <sup>-</sup>	Time						
Santi sa bala s	<u>VA Time</u> 59.23	<u>Wait Time</u> 0.00	9 - 339 - 40 - 54 - 54 - 54 - 54 - 54 - 54 - 54	ann an ann ann ann ann ann ann ann ann		an a	ango 70000 (Cord (Cord (Cord))
*							
×	<u>Number In</u> 1,777.00	<u>Number Out</u> 1,777.00	2469676499699999999999999999999999999999	1999 1999 1999 1999 1999 1999 1999 199	9,459-94449,4634,4634,4637,4737,6797,6797,4239,47,4444444	SPY: YoodBaladaahoo oo	1999 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 - 2007 -

June	З,	2009
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ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units: Minutes
}ox	an a				
∍ per Entity		Average	Half Width	Minim	ım Maximum
Time Per Entity		0.03333333	(Correlated)	0.0333333	33 0.03333333
al Time Per Entity		0.03333333	(Correlated)	0.033333	33 0.03333333
it Time Per Entity		0	0.000000000		0 0
umulated Time		Value			
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mber Out		1,777			
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	alle se anno an an ann an an ann an an an an an an a	Qu	eues	annan Maail (Shuannaa shaan waxaa s		June 3, 200
Soap Batch	Process				Replica	tions: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
ie Detail Sum	imary		· · · ·			
3	40 <sup>70</sup> 7010-201020-0010-0012-2010-0012-0010-0012-0010-0012-0010-0012-0010-0012-0010-0012-0010-0012-0010-0012-0010-001			angelen and a subscription and a subscription of the subscription of the subscription of the subscription of the	1944-1-1020 McR.1942000 20400 20400 20400 20400 20400 20400 20400 20400 20400 20400 20400 20400 20400 20400 20	
			Waiting Time			
igredients Added	Queue		0.00			
cinto Box.Queue			0.18			
Box.Queue			0.00			
e Capper2.Queue			0.00			
e Filler2Tank Reg	•		0.00			
e OrderAuthoriza			116.63			
	pleted Filler.Queue		0.50			
Until Order Com	pleted.Queue		5.21			
na na manana ana ana ana ana ana ana ana		-SUBAE-SULRESOVENERADER/DOCK/DOCK/DOCK/DOCK/DOCK/DOCK/DOCK/DOCK	<b>9613100 (9781)2</b> 100 / <b>96</b> / 19 / 19 / 19 / 19 / 19 / 19 / 19 / 1	Der volgen tillen verske som en s	164 - MARTINIA MANYARAN MANJARANGAN MANJARAN	na A <sup>n a</sup> Fantaine an Anna an Anna an Anna Anna Anna Ann
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igredients Added	Queue		0.00 2.71			
cinto Box.Queue			2.71			
Box.Queue			0.00			
e Capper2.Queue e Filler2Tank Reg			0.00			
e OrderAuthoriza			1.30			
	pleted Filler.Queue		0.00			
Until Order Com	•		0.06			
	p		0.00			

...

		Que	eues	anananahan kenyeningkan periodakan periodakan periodakan periodakan periodakan periodakan periodakan periodakan	June 3, 200
Soap Batch P	Process			Replic	ations: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00 Time Units	Minutes
gredients Addeo	d.Queue	nanan menanen en			
10	พระบบความสาวันสาวอย่างเสียงเหตุการการการการการการการการการการการการการก	Average	Half Width	Minimum	Maximum
Vaiting Time		0	(Insufficient)	0	0
)er		Average	Half Width	Minimum	Maximum
lumber Waiting		0	(Insufficient)	0	3.0000
into Box.Queue	)			10514450715070706657570169595755055055059	
<u>10</u>		Average	Half Width	Minimum	Maximum
Vaiting Time		0.1833	(Correlated)	0	0.3667
)er		Average	Half Width	Minimum	Maximum
lumber Waiting		2.7149	(Correlated)	0	12.0000
Box.Queue					
10	******	Average	Half Width	Minimum	Maximum
Vaiting Time		0	0.00000000	0	0
ier		Average	Half Width	Minimum	Maximum
lumber Waiting		0	(Insufficient)	0	0
e Capper2.Queu	le			1964 i hant bari halan da barakan kata mana kanan kanan 1964 i hant bari handa kanan	
18		Average	Half Width	Minimum	Maximum
Vaiting Time		0	0.000000000	0	0
ier		Average	Half Width	Minimum	Maximum
lumber Waiting		0	(Insufficient)	0	0

		Que	eues		June 3, 2009
Soap Batch P	rocess			Repl	cations: 1
ation 1	Start Time:	0.00	Stop Time:	1,440.00 Time Unit	s: Minutes
Filler2Tank Reg	gulator.Queue	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
10	MINIMUM COMPANY CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRAC	Average	Half Width	Minimum	Maximum
Vaiting Time		0.00000000	(Correlated)	0	0.00000000
ler	916/5878/971910/01/01/61/61/61/61/61/61/61/61/61/61/61/61/61	Average	Half Width	Minimum	Maximum
lumber Waiting		0.00000000	(Correlated)	0	1.0000
OrderAuthoriza	tion.Queue		10567936352966638638687256886785		
)0	₩ 69-25-1969836-\$####################################	Average	Half Width	Minimum	Maximum
Vaiting Time		116.63	(Insufficient)	0	268.74
ler	2411411-111-111-111-111-111-111-111-111-	Average	Half Width	Minimum	Maximum
lumber Waiting		1.2958	(Insufficient)	0	6.0000
Until Order Com	pleted Filler.Qu	eue			
16	novintut v Gladicha, divenda and una su	Average	Half Width	Minimum	Maximum
Vaiting Time		0.5000	(Insufficient)	0.5000	0.5000
IGL		Average	Half Width	Minimum	Maximum
lumber Waiting		0.00104167	(Insufficient)	0	1.0000
Until Order Com	pleted.Queue				
10	*******	Average	Half Width	Minimum	Maximum
Vaiting Time		5.2081	(Insufficient)	5.2081	5.2081
		Average	Half Width	Minimum	Maximum
lumber Waiting		0.05786775	(Insufficient)	0	1.0000

Nuter Nature

Soap Batc	h Process					Replications: 1
ation 1	Start <sup>-</sup>	Fime:	0.00 8	Stop Time:	1,440.00	Time Units: Minute
irce Detail	Summary					
3	7,7,1,000,000,000,000,000,000,000,000,00					
	6	Num Busy	Num Sched	Num Seized	Sched Ut	il
	<u>Inst Util</u>	INUITI DUSY				
per2 PrAuthoriz	0.25 0.50	0.25	1.00	21,324.00 16.00	0.2	5

Resources

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. THE STREET

Soap Batch Proc	ess				Replications: 1		
ation 1 s	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes	
er2 Resource	***						
age	~~~~~	Value					
otal Number Seized	22200022000498894079504504756446647974446	21,324.00	ферпікан править бала с на сала правита на правити на правити на правити на правити на правити на правити на пр	,999899949,599996749977652974657716567679777966767977796767	ng n	<sup>16</sup> ີ ເພນາອາດາຊົນກິນເວລາດຳລັດອິດແຜນ ແ	
Scheduled Utilization		0.2468					
lumber Scheduled		1.0000	(Insufficient)	1.00	00	1.0000	
lumber Busy		0.2468	(Correlated)		0	1.0000	
nstantaneous Utilizatio	n	0.2468	(Correlated)		0	1.0000	
rAuthorization				a maa maa maa maa maa maa maa maa maa m			
age	42,9 <b>11,194,49</b> #40-5411-14-011-14-100-11-14-100-110-100-10	Value	an for an and a state of the	197-294 (1999) (19. 297-297-201-297-201-297-201-297-201-297-201-297-201-297-201-201-297-201-201-201-201-201-20	101471121121121121212121212121212121212121	- 100 100 100 100 100 100 100 100 100 10	
otal Number Seized		16.0000					
Scheduled Utilization		0.4975					
lumber Scheduled		1.0000	(Insufficient)	1.00	00	1.0000	
lumber Busy		0.4975	(Insufficient)		0	1.0000	
nstantaneous Utilizatio	'n	0.4975	(Insufficient)		0	1.0000	
ing Resource				n an			
3 <u>0</u> e		Value		and a statement of the	00000 European weeks	5680 Xaus 1896 180 AW 180 MM	
otal Number Seized		1,777.00					
Scheduled Utilization		0.04113426					
lumber Scheduled		1.0000	(Insufficient)	1.00	00	1.0000	
lumber Busy		0.04113426	(Correlated)		0	1.0000	
nstantaneous Utilizatio	n	0.04113426	(Correlated)		0	1.0000	

Resources

June 3, 2009

	anaan teonaan daa ahaa ahaa ahaa ahaa ahaa ahaa a	June 3, 2009				
Soap Batch Process Replic						
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
Jetail Summ	ary					
:Tank jTank	<u>Level</u> 46.52 108.06	terren teken med neken kende beren med de	dere der flach verste alle freiste dere andere verste freiste verste franze das i son alle ne		98 - Mar (1990) - Californi	nikonan nikation -
Quantity Add	led					
	Total Quantity Added					
ľank Tank	16397.39 21597.39					
Quantity Ren	noved					Martine and a state of the stat
	Total Quantity Removed					
⊺ank Tank	16397.39 21597.39					
		halbanara karanaran yang kanan ka		annan an anna a mulaine anna an an anna an an an an an an an an		Rannyaninantitati

Soap Batch P	rocess				Replications: 1	
ation 1	Start Time:	0.00	Stop Time:	1,440.00	Time Units:	Minutes
2Tank				anna marainn far allan marainn an ann an airteann	na an a	
/el		Average	Half Width	Min	imum	Maximum
evel	1999,0390,0996,049,039,040,040,040,040,040,040,040,040,040,04	46.5219	(Correlated)	ananakanan merkenakanan kananan kananan kanan	0	100.00
al Quantity Added		Value		1997 - Davidson Star Jacobian - Ja		มมัตร์สัมร์ชีมีสินประวัฒนา โอรรมบรรณ์และว่างๆประกาศประวั
otal Quantity Add	ed	16,397.39				
al Quantity Remov	ved	Value	uniangi manakakaka ng	~	50441051415515104155051415505040546534053405	allen kunstaan kunsta
otal Quantity Rem	noved	16,397.39				
ıgTank			9001495655555556566565555555555555555555555			
/el		Average	Half Width	Min	imum	Maximum
.evel		108.06	(Correlated)		0	500.00
al Quantity Added		Value		9-99580-04-07-5405-04-7-440-1-4-400-4-1-4-100-4-1-4-100-4-1-4-1	*****	******
otal Quantity Add	ed	21,597.39				
al Quantity Remo	ved	Value	ng ng manana ng manana ng manana ng manana ng manana na n	\$100.20 \$105154017175 Jan1027472410100000000	700556-0170755659-02-07665550-02-05-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0	10011000000000000000000000000000000000
otal Quantity Rem	noved	21,597.39				

Tanks

June 3, 2009

Sectors,