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Tropicana Beverages

Inbound Truck Use Analysis

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Business Requirement	Objective
Understand the use of the dedicated fleet and seek opportunities for improvement.	To measure, model and optimize the loading, unloading and warehousing of raw materials and components carried by the dedicated Florida Fleet trucks and identify cost reduction opportunities.

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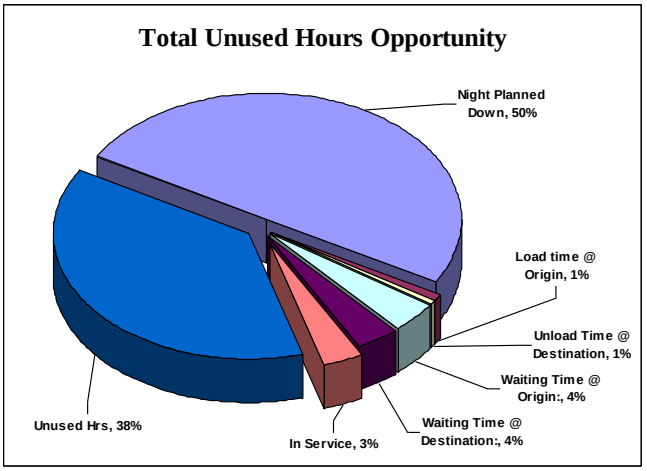
CONTENTS

EXECUTIVE SUMMARY

This document shows the results of a study concerning the Tropicana Florida Dedicated fleet. Several sources of data, such as invoices, trailer logs and AMAPS information, were compiled to calculate a number of utilization metrics. Some of these metrics show that on a 24 hour day, on average, FFE and Sunco trailers are on the road three percent of the time and actually unloading two percent of the time. The loss analysis developed (shown below) demonstrates that considerable savings could be reached if the average time a trailer waits to unload could be reduced from 3.9 days to 2.5 hours. Although it might be too far fetched to initially target such huge improvement, the study shows that a significant portion of these savings can be achieved by eliminating the trailers that take "too long" to unload.

TRAILER TIME BREAKDOWN

# Trailers: 97	**Target Hrs**	**Total Avail. Hrs / Per**	**%**	**Cost / Yr**
	24	65,184	100%	$627,136
Night Planned Down:	12	(32,592)	-50%	$(313,568)
Waiting Time @ Origin:	2.5	(2,413)	-4%	$(25,959)
Waiting Time @ Destination:	2.5	(2,413)	-4%	$(25,959)
Load time @ Origin:	0.5	(483)	-1%	$(5,192)
Unload Time @ Destination:	0.5	(483)	-1%	$(5,192)
Available Hrs:		26,802	41%	$251,266
In Service:		(2,169)	-3%	$(23,841)
Unused Hrs:		24,633	38%	**$227,425**



The loss analysis also shows that if we consider the possibility unloading at night, the total savings could reach close to $541,000.

	TOTAL
Annual Savings Possibility:	$227,425
Cost of Night Planned Down Time:	$313,568
TOTAL:	**$540,993**

Part of the cycle time savings can be captured by increasing empty trailers turnaround. As can be observed in the next table, currently, unused empty trailer hours in Fort Pierce alone add up to $85,389 a year ($64,532 for FFE and $20,857 for Sunco). This report discusses some measures that could be taken to avoid these costs. One of them would be to increase usage by closely monitoring the availability of empties through the use of existing systems. Furthermore, additional savings are also expected for Bradenton, although a precise amount could not be determined because information about empty trailers is not tracked in any way at this location.

Fleet	Route	Facility	Avg. Load/Unload time in days	Unloading Time Breakeven point in days	Average # of trailers waiting to be Unloaded / Loaded	COST/YR
FFE	**Outbound**	FP	2.4		9.5	$64,532
SUNCO	**Outbound**	FP	3.5		4.1	$20,857
FFE	**Outbound**	BR	?		?	?
SUNCO	**Outbound**	BR	?		?	?
SUNCO	**Inbound**	FP	4.5	3.6	15.5	$83,429
FFE	**Inbound**	FP	3.9	2.4	13.4	$112,931
SUNCO	**Inbound**	BR	4.4	3.6	3.7	$15,643
FFE	**Inbound**	BR	2.6	2.4	6.3	$48,399

Another portion of the savings can be achieved by decreasing the time trailers wait to be unloaded. The table above shows that our average unloading times are higher than our breakeven points. A detailed analysis of the data showed that this happened because some trailers took over six days to unload. In Fort Pierce, for the Sunco fleet as much as 86% of the possible savings could be conquered if we could eliminate these trailers by unloading these "outliers". If all the trailers were unloaded at the breakeven point the savings in that facility could reach over $74,000. An exact savings amount could not be pinpointed for Bradenton because only the trailers received in material handling are logged in AMAPS and although a savings quantity was calculated it represents only a fraction of the total.

Finally, given the results that were obtained, some suggestions were made with the objective of improving the process and reducing costs. These included unloading time recommendations, a current process DMS, and a draft "to be" process.

INTRODUCTION

The Tropicana Traffic Department divides the dedicated truck fleet into four main groups. The Sunco National is composed of 24 drivers and 36 refrigerated trailers and services the continental USA. The Sunco Florida is composed of seven trucks and 48 dry trailers. The FFE National services mainly the west coast and is composed of six drivers and six refrigerated trailers. The Florida Fleet (FFE Florida) has 18 drivers and 49 refrigerated trailers.

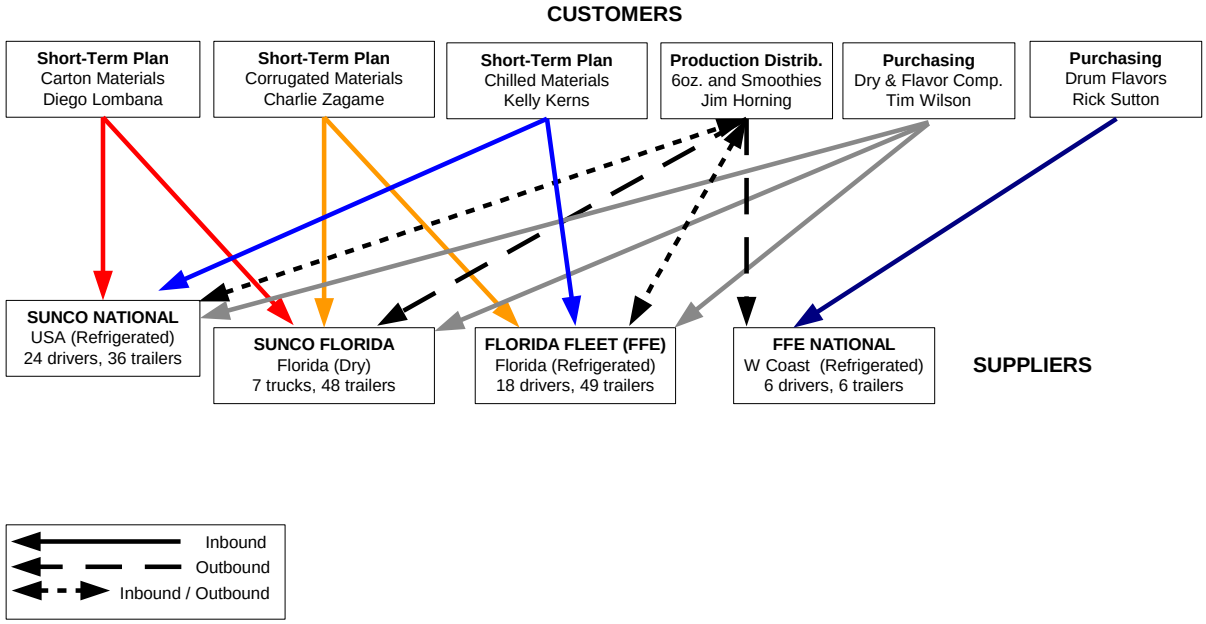
These fleets are used to bring components into Bradenton and take finished goods out to our customers and DCs. Supply Chain and Purchasing are the main users of the inbound side of these transactions. They use these trucks to bring in components such as carton blanks, fitments, dry ingredients and drums.

Recently, a need has been determined to find out if improvements in the ordering process can maximize the utilization of our dedicated fleet. Also, it has been noted that a number of trailers are being used as warehouses. According to traffic department estimates, of the 49 trailers in the Florida Fleet, 22 are needed for that purpose. Sixteen of those are for the Ft. Pierce empty bottles and 6 at Bradenton for the Normandy line. This triggered a necessity to measure our utilization, understand the factors that influence waiting times and the needs for these trailers, comprehend loading and unloading procedures, and to discover our bottlenecks in these operations with the purpose of identifying improvement opportunities. These opportunities might include reducing cycle times, and therefore increasing utilization, or evaluating if new warehouses are required. The intent of this study is to map, understand and find opportunities for cost reductions in the inbound side of the dedicated fleet.

SCOPE

A preliminary study shows the following supply chain users for the dedicated fleet:

DEDICATED FLEET USE DIAGRAM



As can be observed all fleets are used to bring materials into Bradenton. However, according to traffic only the Florida fleets are eventually used as warehouses, especially in our Fort Pierce facility. This allows us to limit the scope of this project to studying the Florida FFE and the Sunco Florida fleets.

This analysis will be limited to the inbound portion of these fleets. These movements can be further split into the inbounds of finished goods and components and this study will target the components piece of these transactions. It will focus on measuring utilization (loads/day), loading and unloading times, and determining the main reasons for delays. To get a good understanding of the entire process, the operations will be mapped from the initial transportation need in the supply chain group to the unloading of the materials in our warehouses.

ASSUMPTIONS

It is assumed that the sources of information for this study are reasonably correct. These sources include Bradenton AMAPS data, Fort Pierce trailer logs, FFE invoices, and Traffic Fleet logs.

OBJECTIVES

The objectives of this project can be defined by the Mission Statement and deliverables described below:

Mission Statement

"To measure, model and optimize the loading unloading and warehousing of the materials carried by the Florida Fleet trucks at the Bradenton and Fort Pierce Facilities with the objective of identifying cost reduction opportunities."

Deliverables

The deliverables for this project are:

i) Performance metrics including
   a. Loads / Day
   b. Loading and unloading cycle times:
      i) Check-in to Dock
      ii) Dock-in to Dock-out
      iii) Dock-out to Check-out
      iv) Time it sits empty
   c. Percentage of trailer time used as storage

ii) A flow chart of the "As Is" process starting with the supply chain transportation need and ending with the unloading of the materials in our warehouses as well as a description of each step.

iii) Cause and effect diagram (root cause analysis) of factors that may influence in loading / unloading times. Determine factors that have been influencing the trailers with the longest cycle times.

iv) Cost matrix & what drives it.

v) Recommendations

APPROACH

The approach that was used to develop the required deliverables is described in the table below:

DMAIC STEP	TASK	RELATES TO DELIVERABLE #
Define	1) Define the scope/problem	SOA document
Measure	2) Find out what data is available.	
	3) Interview business and process owners to collect data and information about each process.	i.a, i.b, i.c, ii
Analyze	4) Analyze available and collected data.	i.a, i.b, i.c, iv
	a. Compare system x collected data to verify input accuracy.	
	5) Map process.	ii
	6) Study bottleneck root causes.	iii
Improve	7) Search for improvement opportunities using process map and root-cause analysis.	iii
Control	8) Develop SOPs to standardize and implement improvements.	v

FINDINGS

The findings from this study will be presented in terms of the deliverables described above.

Cost Matrix

The costs charged by the carriers studied in this analysis can be summarized by the following table:

TRUCK RATES (per Day)	SUNCO FL	FFE
Charge per Truck:	$500.00	$182.57
Truck charge per Mile:		$0.65
Trailer charge per Mile:		$0.03
Daily Charge per Trailer:	$14.29	$22.10
Trucks:	7	18
Total trailers:	48	49

It is easy to see that the main cost driver is the number of trucks in the fleet followed by the number of trailers. The possibility of trying to reduce trailer cycle time by increasing the number of drivers was considered. However, the demand for drivers is a function of the transportation requirements and not of the number of trailers parked in the yard. Besides, even if that was not the case, the fact that the charge per driver is a lot higher than the charge per trailer discards this possibility.

Performance Metrics

Loads / Day

The table below shows a comparison of the costs and utilization of the two fleets. The last column shows their average performance. These averages show that we make a trip with our trailers every 1.8 days (or 0.5 trips/day). However, the trailers are only loaded 70% of the time. This means that on average it takes 2.8 days to make a loaded trip with a trailer (or 0.4 loads/day).

It is interesting to note that the number of trips executed per period by the FFE fleet is almost 4 times the number of trips executed by the Sunco fleet, even though they have practically the same number of trailers. Surprisingly, by dividing the number of loads by the number of trips we find out that Sunco has the higher loaded ratio.

	FFE	Sunco	Avg.
# Drivers:	18	7	
# Trailers:	49	48	
# Trips/Period:	1185	308	746.5
# Loads / period	719	246	482.5
Load Sample Size:	1438	246	
Trip Sample Size:	2370	308	
Trailer / driver ratio:	2.7	6.9	4.8
Trailer Cost / Period:	$ 618.80 + $0.03/Mile	$ 373.33	$ 496.07
# Trips / day / Driver:	2.4	1.6	2.0
# Loads / day / Driver:	1.4	1.3	1.3
Avg. Days / Load / Trailer:	1.9	5.5	2.8
Avg. Loads / Day / Trailer:	0.5	0.2	0.4
Avg. Days / Trip / Trailer:	1.2	4.4	1.8
Avg. Trips / Day / Trailer:	0.9	0.2	0.5
Loaded Ratio:	60.7%	79.9%	70.3%

Sunco, also has much higher days per load ratio, which seams understandable given the fact that it has less than half the number of drivers of the FFE fleet. Because the demand for drivers is probably driven by our transportation needs, why is the trailer to driver ratio so much higher in the Sunco fleet?

One possible answer to this question would be if the Sunco driver is less productive than the FFE driver. However, this answer can be discarded by analyzing the loads per driver ratio. This ratio is very similar for both fleets. Each driver has an average productivity of about 1.3 loads per day.

The other possible answer would be that the commodities that Sunco carries simply take longer to unload. This could be caused by several reasons such as our policy of not unloading full trailers to the warehouse, ordering too much, or perhaps we might really have too many trailers in the Sunco Fleet.

The ratios above were determined using different methods for each of the fleets. For the FFE fleet the invoices from the Traffic Rates department were used. These invoices contain the following information:

DATE	Truck	Ld #	From - To	Beg	Ending	Empty	Loaded	Lumpers
4/12/2004	11095	669565	Trop.Bradenton to Trop.Miramar	376212	376438		226	$0.00
			Trop.Miramar to Graham,Lakeland	376438	376660	222		
		74758-L5	Graham,Lakeland to Trop.Bradenton	376660	376723		63	$0.00

Information from periods 4 and 5 was fed into an Access database and queries were developed to calculate the number of loads per day for the FFE Fleet. These were the results found:

Per.	Empty Miles	Loaded Miles	Empty Miles	Loaded Miles	# of Trips	# Loads	Loaded Ratio	# Days	Loads / Day	Loads / Day / Trailer	Days / Load / Trailer	Trips / Day / Trailer	Days / Trip / Trailer	# of Trailers
4	37715	66,313	36.8%	64.7%	1208	731	60.5%	28	26.1	0.53	1.9	0.9	1.1	49
5	35561	66,998	34.7%	65.3%	1162	707	60.8%	28	25.3	0.52	1.9	0.8	1.2	49
Avg.:	**36,638**	**66,656**	**35.7%**	**65.0%**	**1185**	**719**	**60.7%**	**28**	**25.7**	**0.52**	**1.9**	**0.9**	**1.2**	**49**

The number of loads per day for the Sunco Florida fleet was determined by manually counting the loads from the logs provided by the traffic department. These were the results found for period 4:

Fleet	Total Loads	Total Trips	Loaded Ratio	Loads / Day	Trips / Day	Loads / Day / Trailer	Days / Load / Trailer	Days / Trip / Trailer	Trips / Day / Trailer
Sunco	246	308	79.9%	8.8	11.0	0.18	5.5	0.23	4.4

The number of loaded and unloaded miles for the Sunco Fleet could not be determined because their invoice information contains only the number of trucks and trailers used during the period and is a lot less detailed than the FFE invoice.

The file below has the data used to calculate the information above and other supporting information.

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Inbound Truck\Load /

Unloading Time Breakeven Point

In the next section the time a trailer waits to be unloaded in our facilities will be analyzed. For that reason it is important to understand what should be the ideal unloading cycle for each of our fleets.

The unloading time breakeven point can be easily determined by comparing the cost of unloading the trailers to our warehouse to the daily trailer cost.

UNLOADING COSTS

Operators	Rate/Hr	Unloading Time (Hr)	Labor Cost	Forklift Cost/Hr	Equip. Unloading Cost	Total Unloading Cost
2	$19.12	0.5	$19.12	$14.71	$7.36	$26.48

COST OF LOADING TO FLATBED

Operators	Rate/Hr	Loading Time (Hr)	Labor Cost	Flatbed Cost/Hr	Equip. Unloading Cost	Total Loading Cost
2	$19.12	0.6666667	$25.50	$0.00	$0.00	$25.50

After the trailers are unloaded into the warehouse we also incur the cost of loading the flatbed that will take the materials to the production line. By adding these values a figure of $51.98 is found for the total unloading cost.

Currently, the company is charged $100/week per Sunco trailer and $663/month per FFE trailer. This yields the following break even points in days for each of the fleets:

	Break Even Point SUNCO	Break Even Point FFE
TOTAL UNLOADING COST: $51.98	**3.6**	**2.4**

This break even point does not consider fuel costs that Tropicana has to pay to keep the refrigeration requirements of some of the incoming loads of the FFE fleet. These calculations can give us an initial understanding of the maximum waiting time we should have for each fleet. Priority wise, available warehouse space should be dedicated to unloading FFE loads first because of the lower breakeven point of these trailers.

An important observation must be made at this point. It is believed by the warehouse leads that 14 and 10oz plastic bottles can't be unloaded in the warehouse because they will shrink. After checking with the manufacturer, it was discovered that this is not required and that they keep their stock in non chilled warehouses. However, if they do stay in the trailers they must be chilled because it can reach temperatures of 120^{o}. It seams like the logical solution would be to unload the bottles into the warehouse, whenever possible, and save fuel and reefer charges.

It is also being investigated if the thermostat temperature could be set to 80^{o} rather than the current standard of 70^{o}, in the situation where bottles need to stay in the reefers because of unavailable warehouse space.

Loading and unloading cycle times

Overall results

An analysis of the time and the number of trailers we have waiting in the yard to be unloaded shows the following results:

	Overall Avg. waiting time in days	Avg. # Trailers	COST/YR
Trailers used as whs BR (Check-in to Dock):	3.2	9+Mat. Dist.	$64,042
Trailers waiting to be picked up BR (Dock to Check-out):	?	?	?
Trailers used as whs FP (Check-in to Dock):	4.2	29	$196,360
Trailers waiting to be picked up FP (Dock to Check-out):	3.0	14	$85,389
TOTAL:	3.5	52	$345,791

These results show that it takes a little over three days to unload a trailer in our Bradenton facility and that on average we have nine trailers waiting to be unloaded in material handling plus an unknown number in material distribution. The unused time costs the company about $64,000 per year. The same reasoning can be applied to see the averages for Fort Pierce.

It was not possible to determine the number of trailers waiting in material distribution because this department does not receive the materials into trailer locations in AMAPS, when the load arrives at the plant. It was also not possible to find out how many empty trailers sit in our yard waiting to be picked up. Bradenton does not keep a trailer log such as Fort Pierce's and this information was not tracked, for components, in any of our systems.

In total, we have 52 trailers on a daily basis waiting an average of 3.5 days in our facilities to be picked up or unloaded. This unused time costs the company about $346,000 in a yearly basis.

Bradenton Check-in to Dock

A break down by fleet for the Bradenton facility yields the following averages:

Fleet		Days Analyzed	# Trailers Analyzed	Median Load/Unload time in days	Avg. Load/Unload time in days	Median # Trailers / day	Average # of trailers waiting to be Unloaded / Loaded	COST / YR
SUNCO	**Inbound**	93	71	1	4.4	**3**	3.7	$15,643
	Outbound			?	?	?	?	
FFE	**Inbound**	89	146	2	2.6	**6**	6.3	$48,399
	Outbound			?	?	?	?	
		TOTAL:	217					

The numbers above show that we have more FFE trailers waiting to be unloaded. Each FFE (reefer) trailer costs us $7.81/day more than a Sunco (dry) trailer. It can also be observed that the median unloading time for the FFE fleet is higher than Sunco's, meaning that these trailers also take longer to unload. Recall that the median or the 50^{th} percentile is a better measure of central tendency than the average. It is important to note that the medians are below or at the breakeven points for both fleets even though the averages are above. By comparing medians and averages we can tell if there are outliers in the sample being studied. This can be observed in the Sunco fleet. Its average unload time is reasonably higher than the median suggesting that there are some outliers pulling the average up.

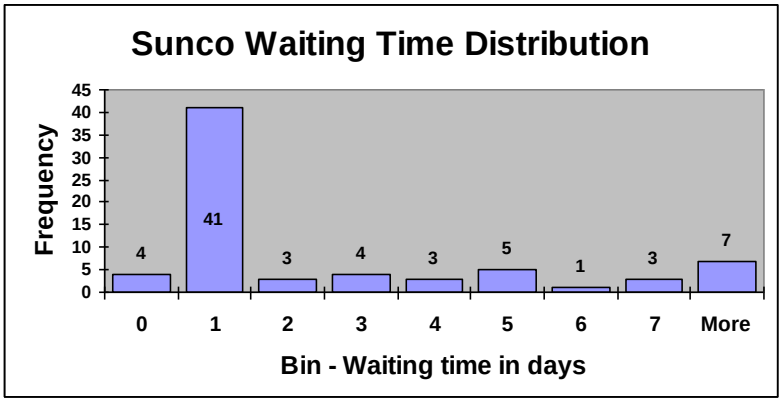
To understand what caused these outliers a list of the 15 longest unloading times for the Sunco fleet was developed:

BalDate	Location	Item	Qty	Cost	Receipt	Item Desc	Days	Fleet
5/20/2004	PLM831083	BR18106	54600	0.22248	3/3/2004	COR 2 69OZ PL PP OJGS CLE	78	SUNCO
7/19/2004	SUNCO46	BR18107	58732	0.22248	6/15/2004	COR 2 96OZ PL PP OJ+CA CL	34	SUNCO
7/19/2004	PLM831083	BR18106	47250	0.22248	6/23/2004	COR 2 69OZ PL PP OJGS CLE	26	SUNCO
4/22/2004	SUNCO51	BR18105	58800	0.22248	4/7/2004	COR 2 96OZ PL PP OJ CL EV	15	SUNCO
4/28/2004	SUNCO43	BR18105	60145	0.22248	4/15/2004	COR 2 96OZ PL PP OJ CL EV	13	SUNCO
6/23/2004	PLM831083	BR18106	50400	0.22248	6/11/2004	COR 2 69OZ PL PP OJGS CLE	12	SUNCO
5/14/2004	PLM353408	BR18105	60000	0.22248	5/4/2004	COR 2 96OZ PL PP OJ CL EV	10	SUNCO
5/19/2004	SUNCO09	BR18107	22050	0.22248	5/12/2004	COR 2 96OZ PL PP OJ+CA CL	7	SUNCO
5/20/2004	SUNCO49	BR18107	56700	0.22248	5/13/2004	COR 2 96OZ PL PP OJ+CA CL	7	SUNCO
4/21/2004	SUNCO52	BR18105	37800	0.22248	4/14/2004	COR 2 96OZ PL PP OJ CL EV	7	SUNCO
6/16/2004	SUNCO45	BR17967B	297540	0.11382	6/10/2004	CTN 64OZ PP OJ OT	6	SUNCO
6/23/2004	SUNCO	BR17968NT	297540	0.11382	6/18/2004	CTN 64OZ PP OJHS EV	5	SUNCO
4/26/2004	SUNCO39	BR17967B	297540	0.11382	4/21/2004	CTN 64OZ PP OJ OT	5	SUNCO
4/19/2004	SUNCO44	BR17969NT	297540	0.11382	4/14/2004	CTN 64OZ PP OJGS EV	5	SUNCO
4/28/2004	SUNCO51	BR18105	12600	0.22248	4/23/2004	COR 2 96OZ PL PP OJ CL EV	5	SUNCO

As can be observed these corrugated and carton loads took a substantial amount of time to be unloaded. Some trailers took up to 78 days to unload. An investigation into the items that were produced during a one month period after the BR18106 was received shows that the material was used about once every two weeks (this component was being phased out). We should try to avoid storing items with such slow turnaround times in the trailers. The BR18107 was used over two times per week. Yet, it remained 34 days in a trailer until it was completely unloaded.

The histogram below illustrates the distribution of the unloading time. It shows that 55 trailers, or 77% of the sample, were unloaded within our breakeven point of four days. The remaining 16 trailers, or 23%, took three days or longer to be unloaded.

# of Days	*Frequency*	*%*	*Cum %*
0	4	5.6%	5.6%
1	41	57.7%	63.4%
2	3	4.2%	67.6%
3	4	5.6%	73.2%
4	3	4.2%	77.5%
5	5	7.0%	84.5%
6	1	1.4%	85.9%
7	3	4.2%	90.1%
More	7	9.9%	100.0%
	71	100.0%	



Bradenton FFE Fleet

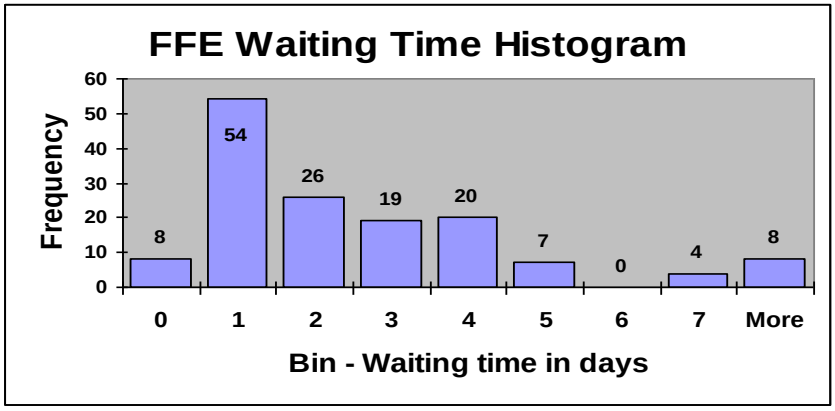
The median and the average for the FFE fleet are fairly close. The average check-in to dock time for Bradenton is 2.6 days while the median is 2 days. This indicates that the data is somewhat evenly distributed around the median. Nevertheless, it is also useful to list the items that took the longest to unload for the chilled fleet. These are the following:

BalDate	Location	Item	Qty	Cost	Receipt	Item Desc	Days	Fleet
6/21/2004	FFE125043	BR95080	42800	0.355381	6/8/2004	SUCROSE 100 OR2200 LBS	13	FFE
6/14/2004	FFE19911	BR95080	42800	0.355381	6/4/2004	SUCROSE 100 OR2200 LBS	10	FFE
5/12/2004	FFE123009	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	9	FFE
5/12/2004	FFE124147	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	9	FFE
6/24/2004	FFE125062	BR16608A	110880	0.069593	6/15/2004	BOTTLE 14OZ PET	9	FFE
5/11/2004	FFE122107	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	8	FFE
5/11/2004	FFE123251	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	8	FFE
5/11/2004	FFE124008	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	8	FFE
7/8/2004	FFE122010	BR95080	42800	0.355381	7/1/2004	SUCROSE 100 OR2200 LBS	7	FFE
5/10/2004	FFE123133	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	7	FFE
5/10/2004	FFE123159	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	7	FFE
5/10/2004	FFE17994	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	7	FFE
6/29/2004	FFE123070	BR18212	28314	0.16077	6/24/2004	BOTTLE 1.75L PET CARAFE	5	FFE
5/20/2004	FFE123098	BR16608A	110880	0.069593	5/15/2004	BOTTLE 14OZ PET	5	FFE
5/8/2004	FFE123141	BR16608A	110880	0.069593	5/3/2004	BOTTLE 14OZ PET	5	FFE

As can be observed sucrose and bottles have the longest waiting periods. An Ask AMAPS query shows that 14oz bottles were used an average of almost 24 times per week after the load of 6/15/04 arrived. Nevertheless, this trailer took nine days to be unloaded. This indicates that in Bradenton, some trailers might be escaping our FIFO rotation policy. This can be solved in a simple manner by checking the receipt dates in AMAPS and making sure we are submitting the trailer location with the earliest arrival.

An analysis of the distribution of the waiting time for the FFE fleet reveals that 107 trailers, or about 73%, of the sample studied were unloaded within FFEs breakeven point of about three days. The remaining 39 trailers or 27% took three days or longer to be unloaded.

# of Days	*Frequency*	*%*	*Cum %*
0	8	5.5%	5.5%
1	54	37.0%	42.5%
2	26	17.8%	60.3%
3	19	13.0%	73.3%
4	20	13.7%	87.0%
5	7	4.8%	91.8%
6	0	0.0%	91.8%
7	4	2.7%	94.5%
More	8	5.5%	100.0%
	146		



All of the above statistics were calculated by analyzing AMAPS trailer location history. A query was created in AMAPS and this information was exported to Excel. Pivot tables and other Excel functions were then used to calculate the averages.

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Inbound Truck\Comp

Fort Pierce Check-in to Dock

If you consider *both* the check-in to dock (*inbounds*) and dock to check-out (empty *outbounds*) cycles, Fort Pierce has about 46 trailers waiting an average of 3.8 days to be unloaded or picked up. This unused time costs the company $297,392 a year.

A breakdown of the *inbound* trailer usage for this plant shows the following averages:

Fleet		Days Analyzed	# Trailers Analyzed	Median Load/Unload time in days	Avg. Load/Unload time in days	Median # Trailers	Average # of trailers waiting to be Unloaded / Loaded	COST / YR
SUNCO	**Inbound**	39	134	3	4.5	16	15.5	$83,429
FFE	**Inbound**	39	137	3	3.9	14	13.4	$112,931
	FP Totals:			3	4.2	30	28.9	$196,360

We should note that in Fort Pierce our highest cost per day is still the use of the FFE fleet ($309.40), even though we have more Sunco trailers waiting to be unloaded. Compared to Bradenton they have higher median unloading times (3 days versus 1 day for Bradenton Sunco and 3 days versus 2 days for FFE) and a much higher number of trailers waiting (16 trailers against 3 trailers for Sunco and 14 trailers versus 6 for FFE).

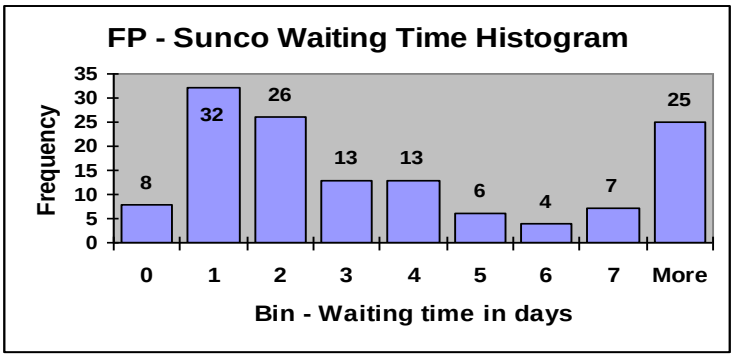
In Fort Pierce the trailers that take the longest to unload usually contain corrugate. The average is 1.5 days higher than the median indicating that the unloading times are not evenly distributed around the median. The table below list the 15 longest unloading periods.

DATE	TYPE	TRL #	CONTENTS	RECEIVED	# of Days
7/20/04	Dry Van	97382	906 CS=7,000 157 CS=16,000	6/22/2004	28
7/8/04	Dry Van	97390	139 CS=9,000	6/15/2004	23
7/1/04	Dry Van	44	821 CS=18,000 334 CS=4,500	6/9/2004	22
7/20/04	Dry Van	97397	102 CS=26,000	6/30/2004	20
6/15/04	Dry Van	97403	414 CS=13,000 914 CS- 2,000	5/27/2004	19
6/11/04	Dry Van	97376	139 CS=6,000	5/26/2004	16
7/11/04	Dry Van	97405	1093 CS=10,000	6/25/2004	16
7/16/04	Dry Van	97403	139 CS=4,000 1093 CS=7,200	7/1/2004	15
6/14/04	Dry Van	46	REJECTED 1.75 BOTTLES FOR GRAHAM PKG.	6/1/2004	13
6/30/04	Dry Van	97394	102 CS= 25,000	6/17/2004	13
7/2/04	Dry Van	97395	717 CS=7,000 1341 CS=4,320	6/21/2004	13
6/22/04	Dry Van	39	102 CS- 26,000	6/10/2004	12
6/28/04	Dry Van	97402	102 CS- 24,000	6/17/2004	11
6/28/04	Dry Van	97407	717 CS=10,000 906 CS=10,000	6/17/2004	11
7/20/04	Dry Van	9	821 CS=9,000 178 CS=8,000 334 CS=8,500 139 CS=4,000	7/9/2004	11

An investigation into the usage of 906 and 157 corrugate (items FP18312 and FP01132B) reveals that 906 were run about twice a week and 157 about 7 times a week. This appears to indicate that in Fort Pierce we also might have some trailers escaping our FIFO rotation policy. The same is true for 139s which were used about nine times per week.

An analysis of the distribution of the waiting time for the Sunco fleet reveals that 92 trailers or about 69% of the sample studied were unloaded within four days. The remaining 42 trailers or 31% took three days or longer to be unloaded. It is also important to note that about 19% of Fort Pierce's Sunco trailers take longer than seven days to unload.

Bin	*Frequency*	*%*	*Cum %*
0	8	6.0%	6.0%
1	32	23.9%	29.9%
2	26	19.4%	49.3%
3	13	9.7%	59.0%
4	13	9.7%	68.7%
5	6	4.5%	73.1%
6	4	3.0%	76.1%
7	7	5.2%	81.3%
More	25	18.7%	100.0%
	134		



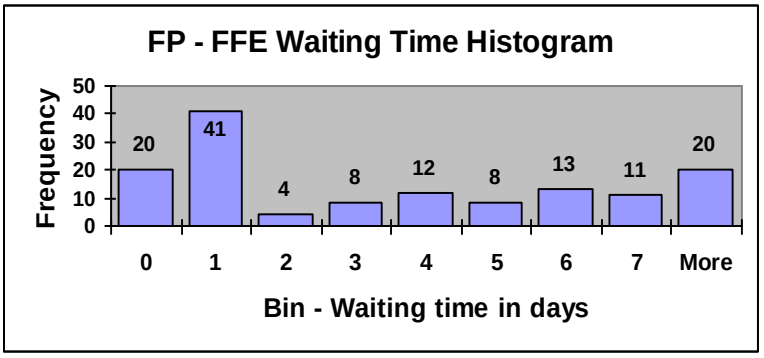
Fort Pierce FFE Fleet

Fort Pierce has an average of 13 trailers waiting to be unloaded. The average check-in to dock time is 3.9 days while the median is 3 days. Both of these figures are above our breakeven point of two days. The 15 longest unloading loads were the following:

DATE	TRAILER #	ITEM	RECEIVED	# of Days
6/15/04	129045	906 BOTTLES=5,760-HOLD	5/27/2004	19
6/18/04	19837	852 BOTTLES=4,224	6/4/2004	14
6/30/04	17994	1.75 BOTTLES=28,314	6/16/2004	14
7/7/04	123101	1162 BOTTLES=4,032	6/23/2004	14
7/14/04	123022	906 BOTTLES=6,912	6/30/2004	14
6/15/04	500030	1.75 BOTTLES=9,438	6/2/2004	13
6/17/04	18837	717 BOTTLES=4,224	6/4/2004	13
7/8/04	16803	906 BOTTLES=12,672	6/25/2004	13
6/21/04	122016	10 OZ. BOTTLES=138,138	6/9/2004	12
6/29/04	123057	852 BOTTLES=12,672	6/18/2004	11
6/14/04	124008	852 BOTTLES=12,672-HOLD	6/4/2004	10
6/17/04	122041	914 BOTTLES=11,520	6/7/2004	10
6/29/04	124206	852 BOTTLES=4,032	6/19/2004	10
6/17/04	123141	717 BOTTLES=9,216	6/8/2004	9
6/24/04	122006	1.75 BOTTLES=28,314	6/15/2004	9

The distribution of the waiting time for the FFE fleet shows that 73 trailers or about 53% of the sample studied were unloaded within three days. The remaining 36 trailers or 47% took three days or longer to be unloaded.

# of Days	Frequency	%	Cum %
0	20	14.6%	14.6%
1	41	29.9%	44.5%
2	4	2.9%	47.4%
3	8	5.8%	53.3%
4	12	8.8%	62.0%
5	8	5.8%	67.9%
6	13	9.5%	77.4%
7	11	8.0%	85.4%
More	20	14.6%	100.0%
	137		



Fort Pierce Dock to Check-out

After the trailers are unloaded the medians show that the company has about 12 trailers waiting about two days to be collected from our yard. This represents a cost per year of $85,359. A breakdown by fleet revealed the following values:

Fleet		Days Analyzed	# Trailers Analyzed	Median Load/Unload time in days	Avg. collection time in days	Median # Trailers	Average # of trailers waiting to be Unloaded / Loaded	COST / YR
SUNCO	**Outbound**	39	64	2	3.5	4	4.1	$20,857
FFE	**Outbound**	39	155	2	2.4	8	9.5	$64,532
	FP Totals:			2	3.0	12	13.6	

The averages are above the medians indicating that some trailers "fall out" of our unloading cycle. This appeared to happen more frequently with the Sunco fleet because its average collection (3.5 days) is somewhat higher than its median (2 days), whereas with the FFE fleet the average and the median are very close. Nevertheless, we usually have more FFE trailers waiting which contributes to an expense that is three times higher than Sunco's even though Sunco trailers take longer to unload. This tells us that we should devote closer attention into collecting our FFE trailers.

As a final remark, it should be noted that the trailer log that Rita Gieras and her team generate on a daily basis played an import role in developing an analysis for Fort Pierce. These logs were stitched together and used to create a database from which the statistical analysis was created.

D:\personal\Files\
Inbound Truck\FP Tra

Dock-in to Dock-out

According to material handling estimates, it takes about a half hour to unload a trailer. We are assuming that this time is approximately the same for the Fort Pierce facility. A cost analysis of this operation can be found in the "Unloading Time Breakeven Point" section.

Percentage of trailer time used as storage and Time it sits empty

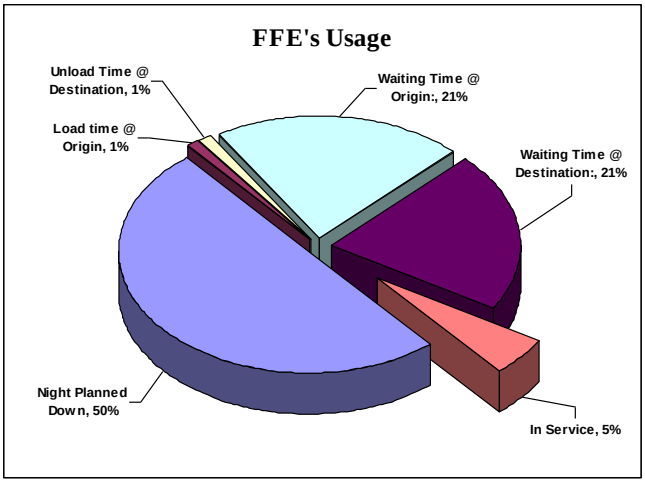
The amount of time a trailer is used as storage was calculated in the "Check-in to Dock" sections of this document and an average of the amount of time a trailer spends empty waiting to be collected was calculated in the "Fort Pierce Dock to Check-out" section. Recall that that the Bradenton Dock to Check-out could not be calculated because Bradenton does not log this information in any of our systems. An estimate of all the unused time in all of our facilities can be calculated from the invoice information of the FFE fleet.

If we add the total miles that were run in periods 4 and 5 and assume that a truck runs at 60 miles per hour while traveling we get an average of 1,722 hours of usage as shown below:

Period	Fleet	Empty Miles	Loaded Miles	Total Miles	Avg Speed	Est. Hours	# of trailers
4	**FFE**	37,715	66,313	104,028	60	1,733.8	49
5	**FFE**	35,561	66,998	102,559	60	1,709.3	49
Avg.:		**36,638**	**66,656**	**103,294**	**60**	**1,721.6**	**49**

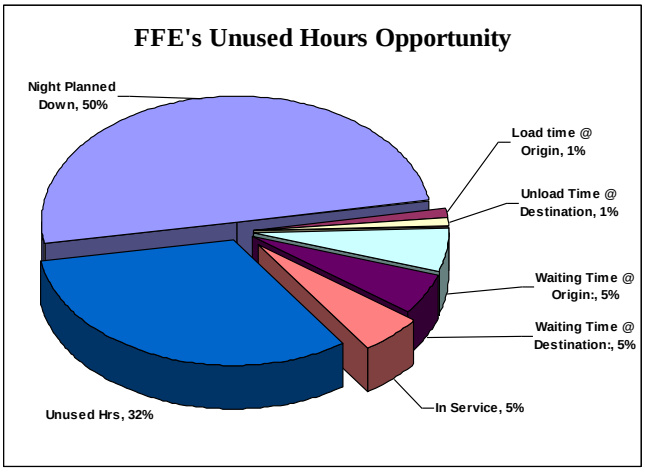
Each trailer has a total of 24 available hours. By multiplying this number by 49 trailers and then by 28 days in a period we get a total of 32,928 hours. This means that the trailers were in the road 5% of the time. Another 2% is spent actually loading and unloading the trailer. The remaining 93% is spent in waiting time. Currently, the breakdown of the usage of a trailer looks like the following:

# Trailers: 49	**Hrs**	**Total Hrs / Period**	**%**	**Cost / Yr**
	24	32,928	100%	$394,176
Night Planned Down:	12	(16,464)	-50%	$(197,088)
Waiting Time @ Origin:	9.8	(7,012)	-21%	$(83,936)
Waiting Time @ Destination:	9.8	(7,012)	-21%	$(83,936)
Load time @ Origin:	0.5	(360)	-1%	$(4,304)
Unload Time @ Destination:	0.5	(360)	-1%	$(4,304)
In Service:		(1,722)	-5%	$(20,608)
TOTAL:		0	0%	0



Using this model a loss analysis could be developed by simulating the optimal situation. The idea is to take the total available hours and subtract the planned night downtime and the targeted waiting periods. For a scenario of target waiting periods of 2.5 hours, the following results would be obtained:

# Trailers: 49	Target Hrs	Total Hrs / Period	%	Cost / Yr
		32,928	100%	$394,176
Night Planned Down:	12	(16,464)	-50%	$(197,088)
Waiting Time @ Origin:	2.5	(1,798)	-5%	$(21,518)
Waiting Time @ Destination:	2.5	(1,798)	-5%	$(21,518)
Load time @ Origin:	0.5	(360)	-1%	$(4,304)
Unload Time @ Destination:	0.5	(360)	-1%	$(4,304)
Available Hrs:		12,150	37%	$145,446
In Service:		(1,722)	-5%	$(20,608)
Unused Hrs:		10,428	32%	$124,837



The table above illustrates that if we were able to have a trailer waiting a maximum of two and a half hours and unload it within a half hour we would have 10,428 free hours per period. This would equate to a $124,837 annual saving opportunity for the FFE fleet alone. If we consider unloading during the night time another $197,837 could be achieved. The total savings could reach up to $321,925 a year. By using FFE's average of 1.5 hours per trip and applying a similar reasoning, the savings for the Sunco can also be calculated (see LoadAnalysis.xls spreadsheet).

	FFE	Sunco	TOTAL
Annual Savings Possibility:	$124,837	$102,588	$227,425
Cost of Night Planned Down Time:	$197,088	$116,480	$313,568
TOTAL:	$321,925	$219,068	**$540,993**

To start capturing these unused hours, we need to look at the "low hanging fruits". We believe that one such opportunity would be to decrease the cycle time of the empty trailers. As illustrated in the "Overall results" section the unused hours of these trailers represent $85,389 in yearly costs in Fort Piece alone. It seemed that some of these trailers had long cycle times because first, we couldn't clearly identify in which facility they were parked, and second the spotter has to drive around the yard until he finds an available trailer. This procedure causes some empty trailers not to be rotated. A possible solution would be to create a sector in the yard where all empty trailers would be placed. This can help the drivers find the trailers faster, save spotter fuel, and would create a visual queue that could help traffic advise the carrier from which facility to pull the empties.

The next step would be to take actions to reduce the waiting time it takes to unload. We can make some recommendations based on the statistical analysis developed in the previous sections. An estimate of the potential savings and the ideal time to unload for each fleet and facility were calculated by subtracting the unloading cost from the waiting cost. The table below illustrates the calculations for Fort Pierce:

Fort Pierce SUNCO

Days	# Trailers	%	Cum %	Savings / Yr	%	Cum %
0	8	6.0%	6.0%	($2,822)		
1	32	23.9%	29.9%	($11,288)		
2	26	19.4%	49.3%	($5,694)		
3	13	9.7%	59.0%	($1,108)		
4	13	9.7%	68.7%	$630	3%	100%
5	6	4.5%	73.1%	$1,093	5%	97%
6	4	3.0%	76.1%	$1,264	6%	92%
7	7	5.2%	81.3%	$3,148	15%	86%
More	25	18.7%	100.0%	$14,586	70%	70%
	134			**$20,721**		

Fort Pierce FFE

Days	# Trailers	%	Cum %	Savings / Yr	%	Cum %
0	20	14.6%	14.6%	($5,593)		
1	41	29.9%	44.5%	($11,465)		
2	4	2.9%	47.4%	($291)		
3	8	5.8%	53.3%	$1,072	2%	100%
4	12	8.8%	62.0%	$4,090	8%	98%
5	8	5.8%	67.9%	$4,381	8%	90%
6	13	9.5%	77.4%	$9,809	18%	82%
7	11	8.0%	85.4%	$10,575	20%	64%
More	20	14.6%	100.0%	$23,364	44%	44%
	137			**$53,291**		

TOTAL: $74,013

The data shows that by unloading the trailers at the breakeven point the company could reach $74,013 in savings. It can also be observed that a significant portion of the savings can be achieved by eliminating the "outliers" ─ trailers taking 7 days or more. An approach would be to start by managing these trailers and gradually progress towards being able to capture 100% of the savings.

The analysis for the Bradenton facility can not be calculated to its full extent because not every trailer that waits in the yard is logged into AMAPS. However, because the AMAPS data represents a sample of the "entire picture", calculating the percentages of the estimated savings can help to generate some guidelines of when to unload.

BR SUNCO

Days	# Trailers	%	Cum %	Savings / Yr	%	Cum %
0	4	5.6%	5.6%	($592)		
1	41	57.7%	63.4%	($6,066)		
2	3	4.2%	67.6%	($276)		
3	4	5.6%	73.2%	($143)		
4	3	4.2%	77.5%	$61	**2%**	100%
5	5	7.0%	84.5%	$382	**13%**	98%
6	1	1.4%	85.9%	$132	**5%**	84%
7	3	4.2%	90.1%	$565	**20%**	80%
More	7	9.9%	100.0%	$1,713	**60%**	60%
	71			$2,853		

BR FFE

Days	# Trailers	%	Frequency	Savings / Yr	%	Cum %
0	8	5.5%	5.5%	($980)		
1	54	37.0%	42.5%	($6,617)		
2	26	17.8%	60.3%	($830)		
3	19	13.0%	73.3%	$1,116	**10%**	100%
4	20	13.7%	87.0%	$2,987	**26%**	90%
5	7	4.8%	91.8%	$1,680	**15%**	65%
6	0	0.0%	91.8%	$0	**0%**	50%
7	4	2.7%	94.5%	$1,685	**15%**	50%
More	8	5.5%	100.0%	$4,095	**35%**	35%
	146			$11,563		

As can be observed AMAPS data shows a potential savings of $14,416. Conversely, it is believed that these savings have to be at least as big, if not bigger, than Fort Pierce's, given that Bradenton produces almost five times of its volume. The Bradenton data also sustains that a good portion of the savings can be obtained by unloading the trailers that have been parked in the yard for 7 days or longer. To monitor this waiting time, perhaps some of the queries developed for this study can be used. However, it is essential that every trailer is accurately logged into AMAPS or some other system.

Finally, smaller savings could be gathered by making small corrections to the existing process. To achieve this goal, the root cause analysis and the process map that was developed to understand the flow of operations can be used.

Process Map

The first type of process map that was developed was a cross-functional flow chart. The cross-functional flow chart can help identify communication or information flow problems as well as redundant steps. It is also important to try to push any operation that is not an action (represented by the rectangles) to be executed in the minimal amount of time possible. These operations represent transportation, waiting and decision making periods. They do not add value to the process.

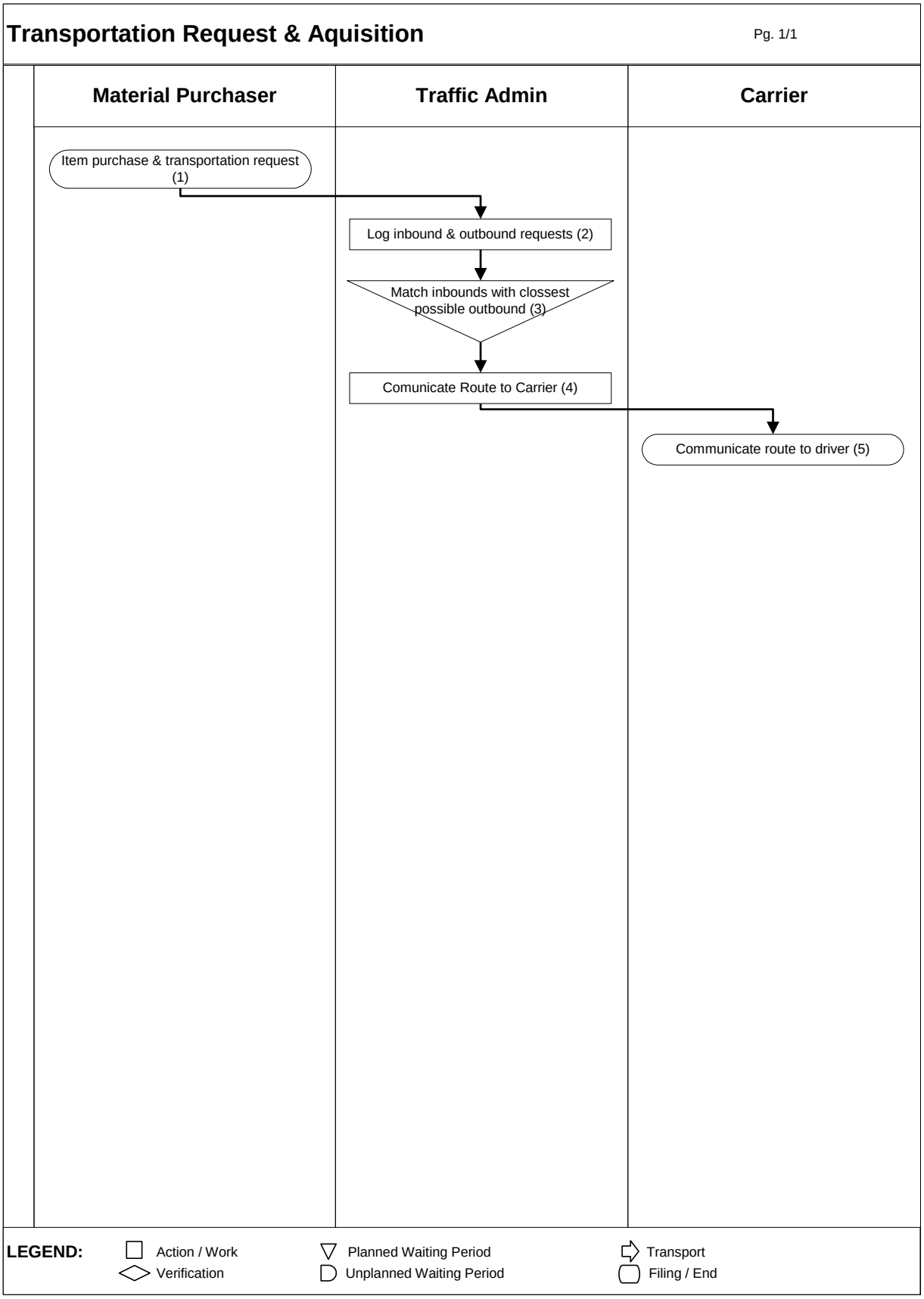
A deep reengineering of the process is not within the scope of this project. However, a simple improvement opportunity was identified in the execution of task number (1) of the material handling and material distribution receipts processes. Quite often, trailer unloading is delayed from 2 to 6 hours because of missing information, such as the trailer number, in the bill of lading. These delays can be easily avoided if the receiving clerk checks the accuracy of the BOL when he receives it. This is an easy action and the receiving clerk is the one who benefits from it, since he is the one that has to hunt for the information when it is missing.

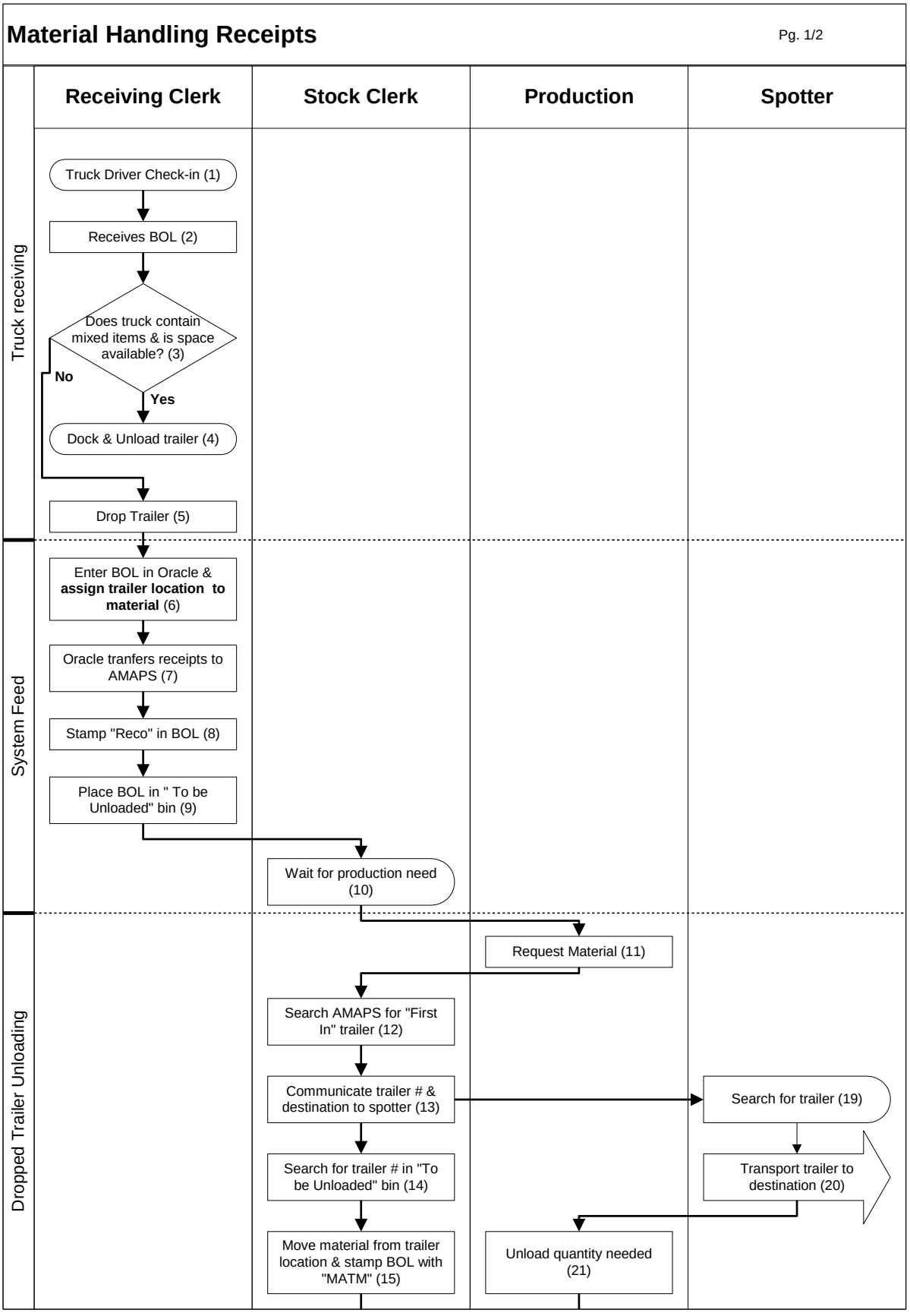
It is important to observe that the procedure to receive drums (Material Distribution Receipts) is quite different from the procedure to receive components (Material Handling Receipts). Every trailer is dropped in Material Distribution whereas in Material Handling the trailers are unloaded if it contains mixed loads and warehouse space is available. The most important difference, however, is that drum receiving does not log the trailers that arrive in our facility in AMAPS. This makes trailer tracking harder and could cause payment problems if the load is not entered into the system within a reasonable time. Furthermore, in some occasions the paperwork on trailers was misplaced and a manual operation had to be conducted to find the materials among the dozens of trailers parked in the yard. This operation can cause delays of up to two days in the unloading of the trucks.

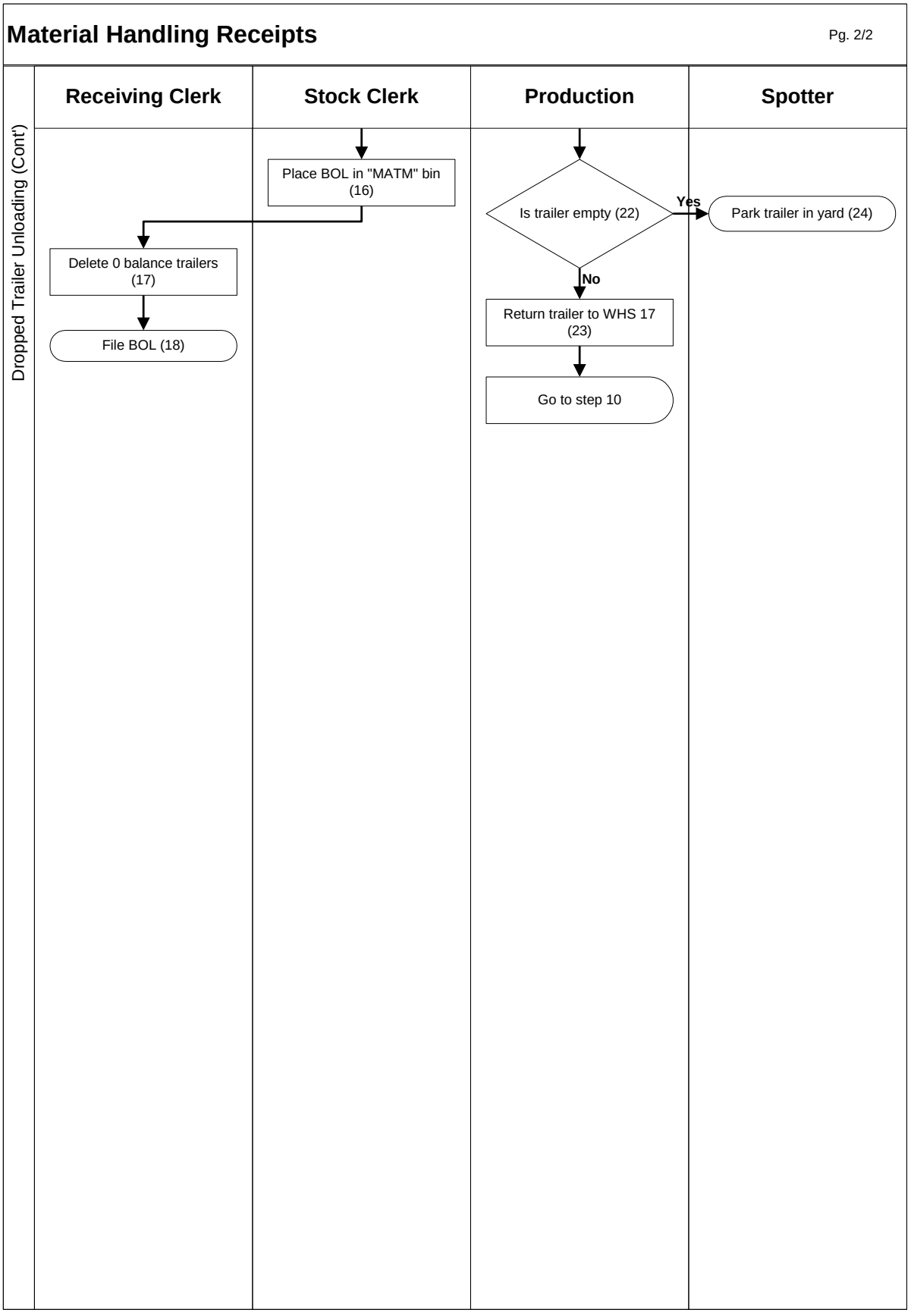
Component receiving and drum receiving also lack the use of a good trailer tracking tool. In the outbound side of the operations, LMS is used to keep track of every trailer movement within the facility. That includes check-in to dock, dock-in to dock-out, and dock-out to check-out. This makes it a lot easier to keep control of our trailers. It is believed that with small changes in the receiving procedure of the inbounds, LMS could be used to keep track of trailer usage on the component receiving side of the operations. Ideally there should be one standard receiving procedure for components and finished goods and a suggestion is made in the "Draft To Be Process" section of this document.

At last, spotter productivity could be increased if a trailer could be designated to a specific spot number. Currently, the spotter takes about 30 to 40 minutes to find a trailer because, like the empties, he has to search for the trailer in the yard. If each trailer was designated a spot number, this cycle could be reduced to as low as 5 minutes. This represents a 600% improvement.

This improvement can be easily achieved by numbering our spots in the yard and creating a card that contains the spot number. This card would be given to the truck driver when he comes into the facility. This process will be described in greater detail in the "Draft To Be Process" section of the document.

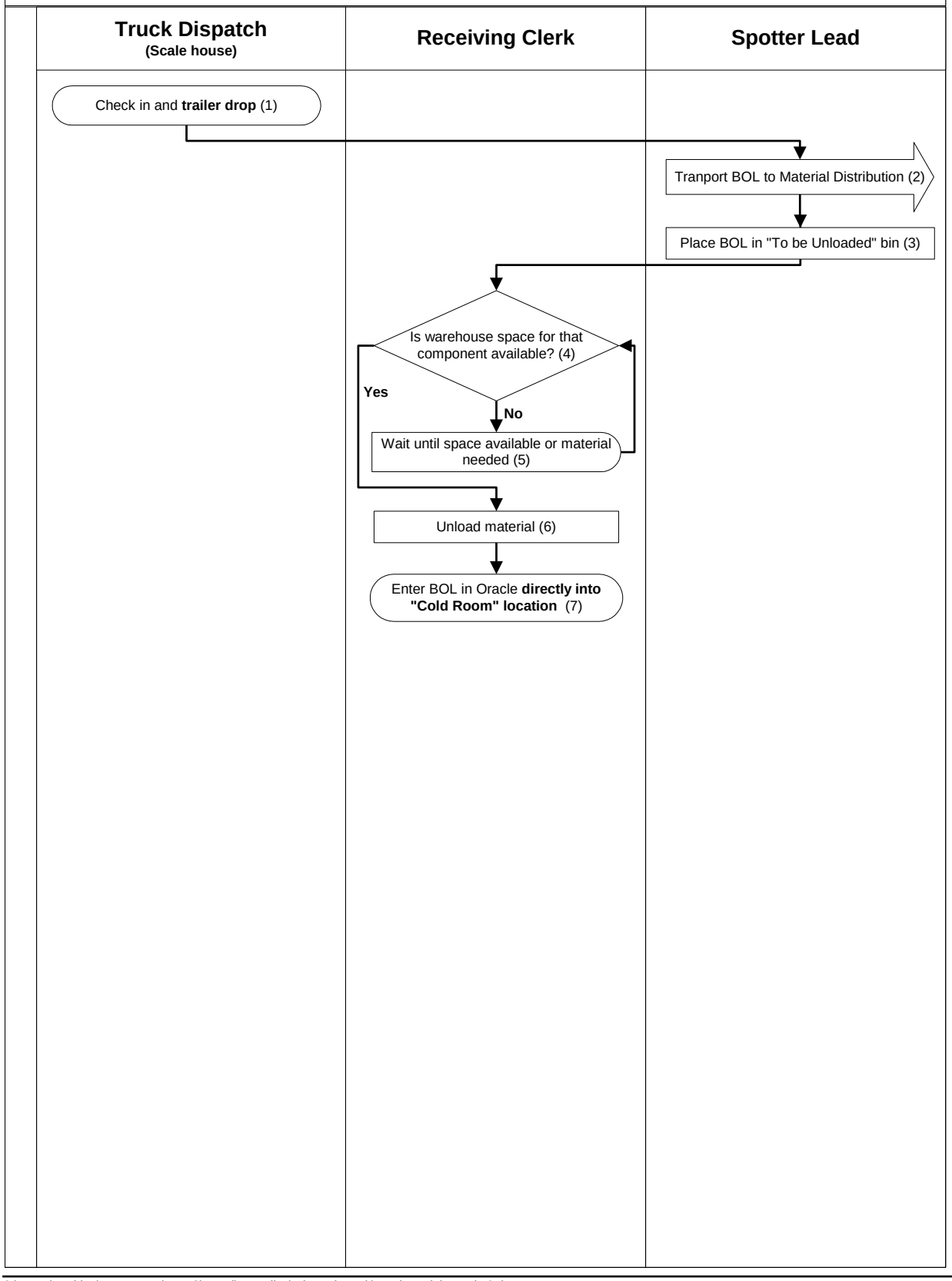

Transportation Request & Aquisition
Pg. 1/1
Material Purchaser
Traffic Admin
Carrier
Item purchase & transportation request (1)
Log inbound & outbound requests (2)
Match inbounds with clossest possible outbound (3)
Comunicate Route to Carrier (4)
Communicate route to driver (5)
LEGEND:
Action / Work
Verification
Planned Waiting Period
Unplanned Waiting Period
Transport
Filing / End


Material Handling Receipts
Pg. 1/2
Receiving Clerk
Stock Clerk
Production
Spotter
Truck receiving
System Feed
Dropped Trailer Unloading
Truck Driver Check-in (1)
Receives BOL (2)
Does truck contain mixed items & is space available? (3)
No
Yes
Dock & Unload trailer (4)
Drop Trailer (5)
Enter BOL in Oracle & assign trailer location to material (6)
Oracle tranfers receipts to AMAPS (7)
Stamp "Reco" in BOL (8)
Place BOL in " To be Unloaded" bin (9)
Wait for production need (10)
Request Material (11)
Search AMAPS for "First In" trailer (12)
Communicate trailer # & destination to spotter (13)
Search for trailer (19)
Search for trailer # in "To be Unloaded" bin (14)
Transport trailer to destination (20)
Move material from trailer location & stamp BOL with "MATM" (15)
Unload quantity needed (21)


Material Handling Receipts
Pg. 2/2
Dropped Trailer Unloading (Cont')
Receiving Clerk
Stock Clerk
Production
Spotter
Place BOL in "MATM" bin (16)
Is trailer empty (22)
Yes
Park trailer in yard (24)
No
Delete 0 balance trailers (17)
Return trailer to WHS 17 (23)
File BOL (18)
Go to step 10

Drum Receiving (Material Distribution Receipts)

Pg. 1/1



The next process mapping step was to develop a 5W1H table. The main objective of this map is to understand the reason behind each task in the process by asking why is the task executed. The "When" dimension determines what triggers each task and if the correct trigger is in place, and the "How" dimension should determine if the task is being executed in the simplest manner possible.

The cross functional flowchart and the 5W1H map are also very useful training tools. They are usually part of the standard operating procedures of a process and can be used to show a new employee how a process is executed and why each task is important in the overall process.

Following the 5W1H map, a KPI identification sheet was developed. The objective of the KPI identification sheet is to find the best KPIs that will track the performance of the process and make sure it is under control. The sheet identifies a task owner, what SOPs and rules are in place, what is the service or product that should be delivered at the completion of the task, and who will be affected (customers) if the task is not completed correctly. Furthermore, a key dimension of the KPI identification sheet is the quality characteristic of the task. This dimension should determine what we should check or do to be world class in each task of the process. Finally, the next two columns determine how the performance of the task should be measured. Even though a KPI is determined for every task, usually the performance of a process can be tracked with only one or two. The KPI Identification sheet allows us to find these indices.

For the purpose of keeping track of our trailers, only one KPI needs to be tracked. That would be the KPI in task number six: The number of errors in Oracle entry. By assuring the accuracy of data in AMAPS several types of reports can be generated to track the use of the trailers. Because the KPI owner should not be the task owner and because he is also a customer of this information (he needs this information on task 12), the stock clerk should be the KPI owner. His task would encompass to mark on a spreadsheet every time a trailer location is not found or is incorrect in AMAPS (the trailer location is entered in Oracle and then transferred to AMAPS). The KPI also needs to be assigned a manager who will work with the task owner to keep the process under control.

The development of a "Trailer AMAPS Accuracy" KPI would assure that the data used to monitor the trailers is correct. This is essential if any kind of daily report will be used to determine if they have been waiting in the yard longer than our breakeven point.

The other piece of the puzzle consists in training the stock clerk to check the BOLs and enter the information in a standard and traceable manner into AMAPS. For that purpose a Standard Operating Procedure can be developed to help the clerk understand what information needs to be in the BOL and how to enter it into the system. The Supply Chain group would be glad to work with other areas in the development of these SOPs and any other reports needed.

Process: Transportation Request & Acquisition **Department(s)**: Supply Chain / Purchasing / Traffic **Pg.**: 1/1

#		Process (What)	Dept. (Where)	Who	When	Why	How
1	□	Supply chain purchases an item and requests transportation for it	Supply Chain Purchasing	Bob Klang Kelly Kerns Charlie Zagame Tim Wilson, Ric Sutton	Need for supplies	Meet production needs Replenish materials inventory	E-mails list of materials with PU#s to traffic & WHS 17
2	□	Traffic Admin logs inbound requests from materials planning & outbound requests from Production Distribution	Traffic	David MacNeal	E-mail request is received	Meet transportation needs and document requests	Enters destination, load # (out) / PU# (in), load date, DLY date into Excel spreadsheet
3	▽	Traffic Admin matches inbounds with the closest possible outbound.	Traffic	David MacNeal	Matching outbound load becomes available	To form closed loop & avoid deadhead miles	Iterative process
4	□	Traffic Admin communicates route to carrier.	Traffic	David MacNeal	Closed loop route has been established	To get truck on the right place at the right time.	Phone
5	□	Carrier communicates route to driver.	Carrier	Carrier Dispatcher	Route is received	To get truck on the right place at the right time.	Radio

□ Action / Work ▽ Planned Waiting Period ⇨ Transport
◇ Verification D Unplanned Waiting Period ▢ Filing / End

Process: Material Handling Receipts (Component Receiving) **Department(s)**: Material Handling **Pg.**: 1/2

#		Process (What)	Dept. (Where)	Who	When	Why	How
1	□	Truck driver checks in	Warehouse 17	Truck driver	Date planned by supply chain group	Deliver requested components	Looks for receiving clerk at warehouse 17
2	□	Receiving clerk receives Bill of Lading Improvement Opt.: Check if the correct trailer # is in BOL	Warehouse 17	Craig Clark (components), Betty Watkins (chemicals & dry ingredients)	Driver arrives. If after 3:00pm, stock clerk receives it.	To document the arrival of the materials & park trailer in proper yard	Stamps "Subject to Inspection" in the BOL, signs & dates it.
3	◇	Does the trailer contain mixed items and warehouse space is available for those items? YES → 4 NO → 5-20	Warehouse 17	Craig Clark, Betty Watkins, Bernard Bell	Driver arrives.	Check if truck should be unloaded	
4	Yes	Dock & unload trailer	Warehouse 17	Truck driver & unloading crew	Driver arrives.	To have material in proper location and free the trailer for other transport	Assure the driver docks in the right place, allocate required resources
5	No	Driver is instructed to drop trailer	Warehouse 17	Craig Clark, Betty Watkins.	Driver arrives.	There isn't enough space to unload the item in whs. (or) The item is scheduled and not worth unloading	If the driver is unaware, he is indicated to the preferred drop zone
6	□	Receiving clerk enters BOL in Oracle and assigns a trailer location to it.	Warehouse 17	Craig Clark, Betty Watkins.	Same day if before 3:00pm. Next day if after 3:00pm.	To acknowledge receipt and pay supplier	Opens PO in Oracle, acknowledges receipt and designates a trailer location.
7	□	Oracle transfers receipts to AMAPS	Mainframe	Automatic feed from Oracle	At the end of every hour	So that the components inventory is updated in AMAPS.	Electronic transaction
8	□	Receiving clerk stamps "Reco" in the BOL	Warehouse 17	Craig Clark, Betty Watkins.	After information has been entered in Oracle	To keep track of which BOLs have been entered in the system	Finds the correct stamp and stamps the Bill of Lading
9	□	BOL goes into 1 of 4 "To be Unloaded Bins": 1) Purity; 2) Normandy; 3) Diversified or 4) Carton Filling	Warehouse 17	Craig Clark, Betty Watkins.	After information has been entered in Oracle	To be aware of what trailers are available to be unloaded.	Places documentation in correct bin.
10	▽ D	Trailer / stock clerk waits for production need	Yard / Warehouse 17	Laura	After receipt operation has been completed	Materials are not needed.	With proper documentation, doors closed, and seal in place.
11	□	Production requests material	Warehouse 17	Production area	Line is being set up	To produce scheduled item	Communicates need to stock clerk through radio.
12	□	Stock clerk searches AMAPS for requested material and uses FIFO policy to release it	Warehouse 17	Laura	Correct request is received	To unload the trailer with the oldest material	Searches in AMAPS for the earliest trailer number received with the material.

□ Action / Work ▽ Planned Waiting Period ⇨ Transport
◇ Verification D Unplanned Waiting Period ▢ Filing / End

#		Process (What)	Dept. (Where)	Who	When	Why	How
13	□	Stock clerk communicates trailer number & location to be delivered to spotter	Warehouse 17	Laura	Trailer number is found on AMAPS	To take trailer from the yard to the correct location	Radio
14	□	Stock clerk searches for trailer # in the "To be Unloaded Bins"	Warehouse 17	Laura	Trailer number is found on AMAPS	To start the material move procedure	Looks through the Bill of Lading for trailer found in AMAPS
15	□	In AMAPS, stock clerk moves the material quantity from the trailer to the warehouse location where it was consumed and stamps "MATM" in the BOL.	Warehouse 17	Laura	Bill of Lading has been found and correct trailer # identified in it.	To move material from trailer location to whs location in AMAPS	Subtracts qty delivered from trailer & adds to new whs. location. Stamps BOL with "MATM".
16	□	Stock clerk places Bill of Lading in "MATM bin" to be processed.	Warehouse 17	Laura	BOL has been stamped with "MATM"	To clean up unnecessary existing locations	
17	□	Receiving clerk deletes trailer locations with a 0 balance (Why can't the stock clerk do this?)	Warehouse 17	Craig Clark	There is paperwork in the "MATM bin".	To free AMAPS resources and allow tracking of trailer use	Types "del" in the appropriate AMAPS screen.
18	⬭	Receiving clerk files Bill of Lading (Why can't the stock clerk do this?)	Warehouse 17	Craig Clark	Unnecessary trailer locations have been deleted.	To maintain a paper trail	Files the BOL by vendor by date.
19	▽ D	Spotter searches for trailer in the yard	Yard	Spotter	Correct trailer number has been identified & communicated to spotter.	To take trailer from the yard to the correct location	Drives around the yard looking for the trailer number
20	⇨	Spotter hooks to the trailer & takes it to production	Yard	Spotter	Spotter finds trailer	To take trailer from the yard to the correct location	Hooks to the trailer & takes it to the appropriate dock.
21	□	Quantity needed is unloaded					
22	◇	Is trailer empty?					
23	No	Return trailer to whs 17 & go to step 10.					
24	Yes	Park trailer in yard with the doors open.					

□ Action / Work ▽ Planned Waiting Period ⇨ Transport
◇ Verification D Unplanned Waiting Period ⬭ Filing / End

Process: Drum Receiving **Department(s)**: Material Distribution **Pg.**: 1/1

#		Process (What)	Dept. (Where)	Who	When	Why	How
1	□	Truck driver checks in & drops trailer.	Scale house (Post 7)	Truck driver	Date planned by supply chain group	Deliver requested drums	Leaves Bill of Lading in the scale house (Post 7) and is instructed general drop area
2	▽⇨	Spotter lead picks BOLs at scale house & takes them to material distribution	Scale house (Post 7)	Steve	2 to 3 times a day	To let receiving clerk know what has arrived	Drives by scale house
3	□	Spotter lead places BOLs in "To be Unloaded" bin	Material Distribution	Steve	Lead brings BOLs into the office.	To know what has arrived	
4	◇	Is warehouse space for that component available? YES → 5 NO → 6-7	Material Distribution Cold Room	Julie Smith	Lead brings BOLs into the office.	To know if material can be unloaded	Checks available space.
5	No ▽	Receiving clerk waits until space becomes available or material is needed (usually 1 wk tops)	Material Distribution Cold Room	Julie Smith	Lead brings BOLs into the office.	To be able to unload material into proper location	
6	Yes □	Unload material into cold room using FIFO policy	Material Distribution Cold Room	Julie Smith	Space becomes available	To have material in proper location and free the trailer for other transport	Asks spotter to find the trailer and bring it in.
7	□	Receiving clerk enters BOL in Oracle directly into "cold room" location	Material Distribution	Julie Smith	Material has been unloaded	To acknowledge the receipt of the material and allow payment	Opens PO in Oracle, acknowledges receipt and designates a trailer location.

□ Action / Work ▽ Planned Waiting Period ⇨ Transport
◇ Verification D Unplanned Waiting Period ▢ Filing / End

KPI Identification Sheet

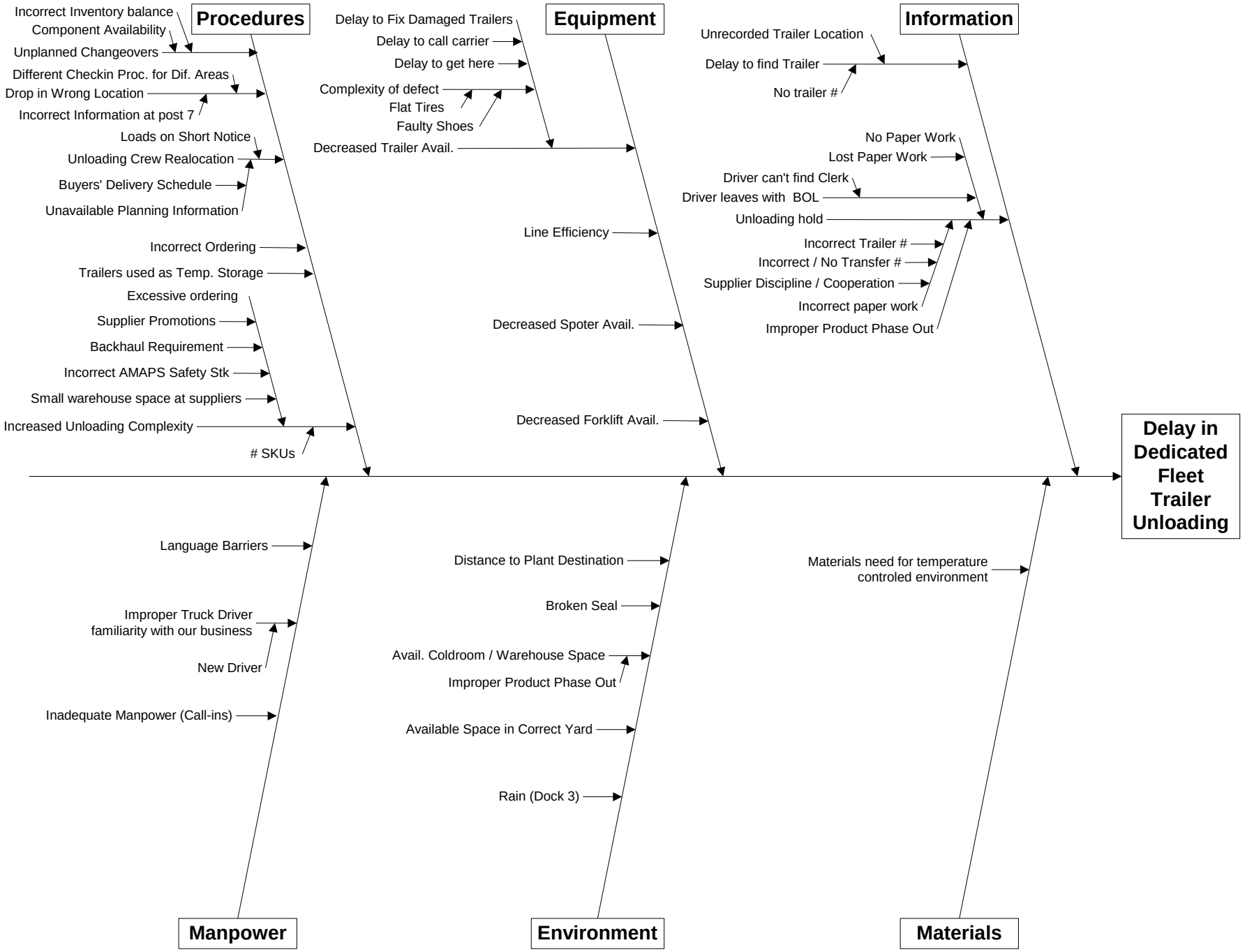
Process: Component Receiving **Dept(s):** Material Handling **Date:** **Revision:** 1

#	Task	Task Owner	Rules & SOPs in Place	Service / Product Supplied	Customers	Quality Characteristic or Check	KPI	Unit
1	Truck driver checks in	Receiving Clerk		A trailer with components for production of our products	Supply Chain Purchasing Production	Is the truck driver checking in the correct location? If not instruct him to the right location & procedure		
2	Receiving clerk receives Bill of Lading	Receiving Clerk		A properly received BOL with correct information to allow easy retrieval of the trailer	Supply Chain Purchasing Production Yard Spotters	Confirm if correct trailer #, transfer # & all required information is in the BOL to have flawless paperwork	- Trailer check in time - # of BOLs with incorrect information accepted.	- Time - #
3	Does the trailer contain mixed items and warehouse space is available for those items? YES --> 4 NO --> 5-20	Warehouse manager, Receiving Clerks		Unloaded trailer with components in proper place	Supply Chain Purchasing Whs 17 Traffic	When is this trailer needed? Do I have the space to unload the truck and free up the trailer?		
4	Dock & unload trailer	Yard spotter Forklift operators Receiving Clerk		Unloaded trailer with components in proper place	Whs 17 Supply Chain Purchasing Traffic	Materials unloaded into the proper spots and correctly labeled. Zero Accidents. Flawless paperwork.	- Dock in Time - # of Pallets correctly labeled - # of pallets in wrong Locations - Dock out Time	- Time - # - # - Time
5	Driver is instructed to drop trailer	Receiving Clerk		Trailer dropped in easy to find location & correct documentation	Yard spotters Supply Chain Purchasing Traffic	Trailer dropped in correct location. Least amount of time to point of use. Flawless paperwork.	- Time to find trailer.	Min.
6	Receiving clerk enters BOL in Oracle and assigns a trailer location to it.	Receiving Clerk		Oracle entry in timely fashion with correct quantities & information	Payment Comp. Inventory Purchasing SC Whs 17	100% accurate information **(including trailer #)** in the system. Input in system by the end of shift.	# of errors in Oracle entry.	#
7	Oracle transfers receipts to AMAPS	IT		Component balances in AMAPS	Comp. Inventory Purchasing / SC	Correct & timely information transfer into AMAPS	Number of incorrect transactions in AMAPS due to unfinished electronic transfers	#
8	Receiving clerk stamps “Reco” in the BOL	Receiving Clerk		Control of what has been "Recoed"	Receiving Clerk	Well marked stamp as soon as BOL is entered	Planned production dock in time	Time

9	BOL goes into 1 of 4 "To be Unloaded Bins": 1) Purity; 2) Normandy; 3) Diversified or 4) Carton Filling	Receiving Clerk		Control of what is available to be unloaded	Receiving Clerk Whs 17 Purchasing / SC	100% of BOLs in correct bin. No BOLs lost.	Number of trailers without paperwork	#
10	Trailer / stock clerk waits for production need	Stock Clerk			Traffic SC / Purchasing	Shortest wait possible	Actual dock in Time at the Production line	Time
11	Production requests material	Production Clerk?		Component in the line at the appropriate time	Production	0 delays in production because of trailer issues	- Actual dock in Time at the Production line - # of delays in production with reason codes	- Time - #
12	Stock clerk searches AMAPS for requested material and uses FIFO policy to release it	Stock Clerk		Earliest trailer # that arrived with requested material	Production	100% of the trailers found in the system. Flawless paperwork. Oldest material delivered first.	- # of BOLs with incorrect information accepted. - # of errors in Oracle entry.	- # - #
13	Stock clerk communicates trailer number & location to be delivered to spotter	Stock Clerk		Component in the line at the appropriate time	Production	100% accurate trailer # & dock # communicated to spoter.		
14	Stock clerk searches for trailer **#** in the "To be Unloaded Bins"	Stock Clerk		BOL with 100% accurate information, ready to be moved in AMAPS	Production	Zero lost documents	# of delays caused by lost documents	#
15	In AMAPS, stock clerk moves the material quantity from the trailer to the warehouse location where it was consumed and stamps "MATM" in the BOL.	Stock Clerk		Accurate component inventory, in the correct locations, in AMAPS	Supply Chain	100% accurate transaction and information in AMAPS, by the end of shift	Number of whs locations in AMAPS with incorrect component inventory	#
16	Stock clerk places Bill of Lading in "MATM bin" to be processed.	Stock Clerk		BOL with 100% accurate information, ready to be filed	Whs 17	Proper BOL in proper bin		
17	Receiving clerk deletes trailer locations with a 0 balance.	Receiving Clerk		AMAPS maintenance. Trailer tracking ability.	IT / Supply Chain / Traffic	100% of unused trailer locations deleted	# of unused locations not deleted	#
18	Receiving clerk files Bill of Lading	Receiving Clerk		Accurate, easily retrievable archived BOLs	Whs 17 Purchasing / SC Traffic	100% BOLs filed in cabinet, under correct vendor name, ordered by receiving date		
19	Spotter searches for trailer in the yard	Spotter		Trailer found in the smallest amount of time	Production	Is the trailer parked in an easy to find/appropriate location?	Time to find trailer in a safe manner	Min.
20	Spotter hooks to the trailer & takes it to production	Spotter		Trailer delivered in shortest amount of time	Production	Is the trailer parked as near as possible to the destination?	Time to deliver trailer in a safe manner	Min.

Root cause analysis

The root cause analysis diagram was developed by interviewing the task owners depicted in the "Who" column of the 5W1H map and is fairly self-explanatory. It is worth noting that the heaviest branch of the diagram falls in the procedures category. This represents a good opportunity because procedure changes do not require a lot of capital. Most of these causes can be eliminated by retraining people or setting up cross-functional FI teams to improve the process.


Procedures
Incorrect Inventory balance
Component Availability
Unplanned Changeovers
Different Checkin Proc. for Dif. Areas
Drop in Wrong Location
Incorrect Information at post 7
Loads on Short Notice
Unloading Crew Realocation
Buyers' Delivery Schedule
Unavailable Planning Information
Incorrect Ordering
Trailers used as Temp. Storage
Excessive ordering
Supplier Promotions
Backhaul Requirement
Incorrect AMAPS Safety Stk
Small warehouse space at suppliers
Increased Unloading Complexity
SKUs
Equipment
Delay to Fix Damaged Trailers
Delay to call carrier
Delay to get here
Complexity of defect
Flat Tires
Faulty Shoes
Decreased Trailer Avail.
Line Efficiency
Decreased Spoter Avail.
Decreased Forklift Avail.
Information
Unrecorded Trailer Location
Delay to find Trailer
No trailer #
No Paper Work
Lost Paper Work
Driver can't find Clerk
Driver leaves with BOL
Unloading hold
Incorrect Trailer #
Incorrect / No Transfer #
Supplier Discipline / Cooperation
Incorrect paper work
Improper Product Phase Out
Delay in Dedicated Fleet Trailer Unloading
Language Barriers
Improper Truck Driver familiarity with our business
New Driver
Inadequate Manpower (Call-ins)
Distance to Plant Destination
Broken Seal
Avail. Coldroom / Warehouse Space
Improper Product Phase Out
Available Space in Correct Yard
Rain (Dock 3)
Materials need for temperature controled environment
Manpower
Environment
Materials

Recommendations

This study revealed some ideas that could be used to reduce the cycle times of our trailers. These would include:

- Using existing tools such as AMAPS, LMS, or the upcoming Red Prairie to keep better track of trailers and their locations. These tools would be used to monitor trailer waiting times and trigger an unloading action once our breakeven time is reached. Furthermore, these systems need to keep track our empties to allow better visibility and utilization.
- Determining some unloading guidelines for full trailers as follows:

	Bradenton	**Fort Pierce**
SUNCO	4 days	4 days
FFE	3 days	3 days

- Partials should be unloaded into to the warehouse as soon as returned from packaging.
- Checking daily for aging loads.
- Consider unloading at night
- Creating a designated area for the empty trailers.
- Creating a KPI to monitor data accuracy in the system that will be used to control trailer unloading decisions. This task would also incorporate assigning a KPI owner, responsible for collecting and compiling KPI data, and a KPI manager responsible for monitoring the KPI and working with the task owner to keep the process under control.
- Numbering the spots in the yard to speed up the process of finding trailers.

After these measures are in place, the number of empty trailers will start to increase and because the empties will be in a designated area this will be easily verified. The count of empty trailers should be communicated to traffic on a daily basis so that the fleet size can be reduced accordingly.

Given what was revealed in the current study an idea for a draft to be process was developed. Obviously, any reform of a process has to be made by a cross-functional team involving people from the several departments the process encompasses. This draft process was meant to give this team a starting point.

Draft "To Be Process"

1. Truck driver checks in at the scale house
2. Shows BOL
3. Scale house logs the BOL in LMS with a nonexistent item #, picks up a card with a spot #, & instructs driver to appropriate location
4. Driver drops trailer in designated spot # and checks into warehouse 17
5. Driver drops BOL and card with receiving clerk
6. Receiving clerk checks documentation for mistakes & writes spot # in BOL
7. If any mistakes are found double check information with truck driver immediately
8. Log BOL in Oracle, assign trailer number & spot number to the location (i.e. TRAILER# - SPOT#).
9. Stamp RECO at BOL

10. Clip Spot number card on BOL or write Spot number on BOL.
11. Place BOL in "To be Unloaded" bin
12. Trailer / stock clerk waits for production need
13. Production requests material
14. Stock clerk searches AMAPS for requested material and uses FIFO policy to release it
15. Stock clerk searches for trailer # in the "To be Unloaded" bin
16. Stock clerk communicates trailer number, spot #, and location to be delivered to spotter
17. In AMAPS, stock clerk moves the material quantity from the trailer to the warehouse location where it was consumed
18. Stock clerk places Bill of Lading in "MATM bin" to be processed
19. If the trailer was completely unloaded, stock clerk places spot # card in a "Available spots" bin
20. Lead takes cards to scale house on the next day
21. Receiving clerk deletes trailer locations with a 0 balance.
22. Receiving clerk files Bill of Lading
23. Spotter searches for trailer in the yard
24. Spotter hooks to the trailer & takes it to production
25. Quantity needed is unloaded
26. Is trailer empty? If yes, park trailer in designated "empty trailers" area.
27. If not, return trailer to warehouse 17
28. Partial trailer is unloaded
29. Empty trailer is parked in designated yard area.

Conclusion

The analysis of available information shows that there are some opportunities for savings if cycle times of empty and loaded trailers can be reduced. A loss analysis shows that if we could unload a trailer in two and a half hours we could save over 227,000. If we consider unloading at night these savings could reach close to $541,000. To start capturing these savings, existing systems need to be better utilized to monitor the use of these trailers in a daily basis. AMAPS can be used to keep track of trailer locations and LMS can track usage time. With these systems, reports can be generated to keep an eye on empty trailers and check for aging loads to determine a course of action.

Unused trailer hours in our Fort Pierce facility account for $85,000 a year for both fleets. It is believed that after designating a specific place for empty trailers and good monitoring tools are available, the added visibility could capture these costs by increasing the turnaround of the empties. Bradenton savings could not be estimated because no information is logged concerning empty trailers in this facility.

With respect to check-in to dock time, the study has shown that in Fort Pierce alone over $51,000 a year can be saved by unloading the trailers parked in the yard for over six days. If all the trailers were unloaded at the breakeven point the savings would reach over $74,000. Similar savings are expected for Bradenton.

It is anticipated that if reliable measurement tools are in place and the trailers are monitored on a daily basis most of these savings can be achieved within a short timeframe by eliminating the outliers from the system.