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Sauce Repackaging Test: Atlanta

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Sauce Repackaging Test: Atlanta



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ISYE 4803 Senior Design Project – Spring 2018

Industrial and Systems Engineering

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Executive Summary

Overview

This project belongs to the Chick-fil-A Supply Chain Innovation Team. This team has designed a new packaging product, which breaks down their current packing product into smaller load units. The Atlanta Sauce test was the first live implementation of this new product, the inner pack. The Supply Chain Team began preparing for this test in May 2017. In this test, the team were specifically looking for product issues, benefits, product user behaviors, and areas of improvement.

Objective

The purpose of this project was to research the implementation of a new sauce packaging. During this research, the current sauce replenishment process and layout was defined, measured, analyzed to form any critical recommendations that would improve future implementations of this new process.

Solution

To achieve the goal of making improvements to the replenishing process, the Six Sigma Methodology approach was used. With using this approach, an optimized replenishing process, a standardized layout of a Chick-fil-A restaurant, an inner pack alternative design and cost analysis was suggested as improvements to the new packaging process. These recommendations are well documented, tested, and detailed. The recommendations were presented to the Chick-fil-A Supply Chain Team on April 19, 2018.

Chapter 1:
The Truett Dwarf Special Project Analysis

Chapter 1: The Truett Dwarf Special Project Analysis

Introduction

Packaging is a powerful element in supply chain logistics. This element can control a company's inventory space, shipping cost, and overall production efficiency. The Chick-fil-A Supply Chain Innovation team are in the process of revamping their packaging of their condiments. To start this process off, they are beginning with their signature sauces. Eric Stogner the Kitchen Design, Design & Construction Engineer chose to start with this element first, because "It is the hardest condiment to control".

System Overview

Each Chick-Fil-A restaurant is unique to its' own design. This feature can cause complications when implementing or modifying a new process in the overall system. Currently, at Chick-Fil-A restaurants, condiments are being shipped and stored in large 432 count boxes. The individual condiments packages are stacked in rows inside the box with each row separated by a sheet of cardboard. The boxes are stored in the main inventory located in the back of the restaurant (back of house) on storage racks until they are needed to stock front of house. In most locations, when needed, the team member will carry the box up from the back of house and store it in the front of house to be distributed to each condiment station on the front counter and the drive-thru. To stock each station, the team member must take a row of condiments from the case and fill each bin. In a small amount of locations, managers have certain associates refill empty condiment bins in a private location and store the full bins in that area.

The Chick-fil-a Supply Chain Innovation team have designed a new packaging method for their condiments and are implementing this method into selected restaurants. Their goal is to decrease used storage space in inventory, save daily labor times from organization, and reduce ladder usage.

Objective

The goal of this project was to perform research for Chick-fil-A to see if the implementation of a new sauce packaging would provide improvements to the current sauce replenishment process and layouts in six restaurants. Then once this new process is analyzed, suggestions of any critical recommendations that would improve future implementations of this process will be made with utilizing Industrial & Systems Engineering problem solving skills, and statistical analysis skills.

Project Background

This project is a part of an overhaul of Chick-fil-A's Supply Chain. The overall goal of the whole project is to decrease case sizes for all products in inventory currently ordered by each restaurant. The initial project is the condiments. The next step will be to test out a wider range of products in a test later.

Minimum Success Criteria

The minimum success criteria were sectioned into three parts: Functionality, Scheduling, and Technicality. These criteria are shown below in Figure 1.1.

Functionality	<ul style="list-style-type: none">•Increase Storage room space in stock room•Minimize the time Team Members spend restocking condiment bins•Increase safety
Scheduling	<ul style="list-style-type: none">•Complete all deliverables by Gantt chart due date•Schedule any necessary meetings with Chick-fil-A Supply Chain team a week in advanced•Have weekly team meetings
Technicality	<ul style="list-style-type: none">•Perform an analysis on any collected data•Verify and validate Chick-fil-A Supply team reasoning for test•Recommendation for future implementations of the sub-packaging process

Figure 1.1: Minimum Success Criteria

Chapter 2:
Literature Review

Chapter 2: Literature Review

KANE

KANE is a logistical distributions company that assist its' customers in the distribution of their products. In KANE's history, some of its customer has incorporated smaller packaging which saves them money from a logistical stand point.

KANE's findings with their customers that incorporated smaller boxes from a logistics stand points leads to saving money in their supply chain process.

Less material used:

The customer's that reduced how much material was used in this process saved money on their transportation of their goods. The small packaging reduced the number of trucks used to transport its products. If this method was used in Chick-fil-a's logistics of how their condiments packages made it to their restaurants. There could be money saved at each location because, fewer deliveries would be needed to sustain an adequate inventory for operations. Furthermore, by having fewer deliveries, less labor hours will be needed in the unloading of delivery trucks because of the drop- in deliveries need to sustain condiment stock.

Less likely for delivery issues

The customers that had less middle men in their supply chain process had less cost, error, delays and damages. If Chick-fil-A were to also integrate a one stop shop for packaging and shipments of the condiments to the restaurants, the cost would be reduced because less resources are needed in the process. Increased efficiency means less labor hours, machines used, and fuel needed in the transportation process. There will be fewer errors and a decreased likelihood of damaged products because there will be less handling of the packages from the assembly line to the restaurant. With the decrease in errors and damaged products there will be less time spent on deliveries which will result in less of a delay in product delivery.

Coca-Cola Fridge Packs

One of the biggest influences in packaging of the last 20 years is Coca-Cola's innovation of the soda can package. In 2001 Coke released the "Fridge Pack." Before the release of the fridge pack, soda was packed in 3x4 can 12-packs. Because of the shape of the old package, consumers would usually only be able to have 3-4 cans in their refrigerator at a time and would often not replace what they used. When the 2x6 can fridge pack was released the new design allowed the consumers to fit an entire pack in their fridge.

The new design was tested on a small scale by one bottling company that was willing to devote some resources to test the innovative package. The success of the initial test soon caused the supplier to change to exclusively producing fridge packs. With the new packaging gaining popularity from the consumers, other Coca-Cola bottlers soon followed suit.

The ease of the restocking caused the fridge pack to be a resounding success with sales increasing by a double-digit rate without them having to raise prices. The simple act of changing the packaging to better fit in the consumers refrigerators has had such an effect on the industry, that less than 20 years later the entire industry produces almost exclusively fridge packs.

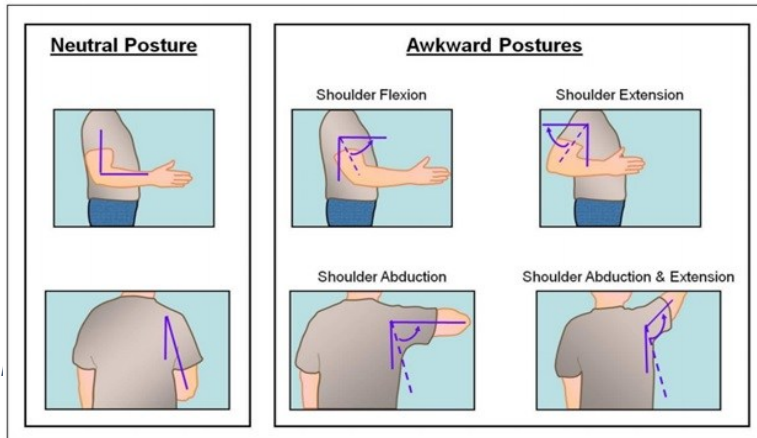


Figure 2.1: Show a human’s Neutral and Awkward Posture for the shoulder (Ergonomics Plus)

observation period, it was noted that employees were reaching awkwardly at times to reach items they needed. For example if they needed to retrieve Chick-fil-A sauce, which is the most popular sauce, was located in an awkward reach location, this would put minor stress on Chick-fil-A’s team members body. Over time, this awkward reaching could lead to injuries. In the Article, “ 8 Fundamental Ergonomic Principles for Better Work Performance,” from ErgonomicsPlus, a company that assist other companies in improving their work

environments, gives the suggestion that workers being kept from awkward postures and stay more in neutral postures tend to reduced injuries. Figure 2.1 are postures considered in the creation of standardized set-ups. The different condiment’s locations were set-up in a way where upon a customer request, the employee will be limited to a neutral posture.

The condiments that are requested the least were placed in location that require awkward posture. The reason for this is because the amount of area Chick-fil-A has for condiments is limited, so there is no way to position all in a location that keeps the employee is neutral posture. Figure 2.2 demonstrates the type of reaches the employee is expected to make while reaching for condiments.

Ergonomics Plus

To better help with creating the best possible set-up for a standardized Chick-fil-A’s counter set-up. The biggest factors to be considered was the frequency a Chick-fil-A employee had to reach for an item, the time it takes to retrieve the item, and where the item is located. During the

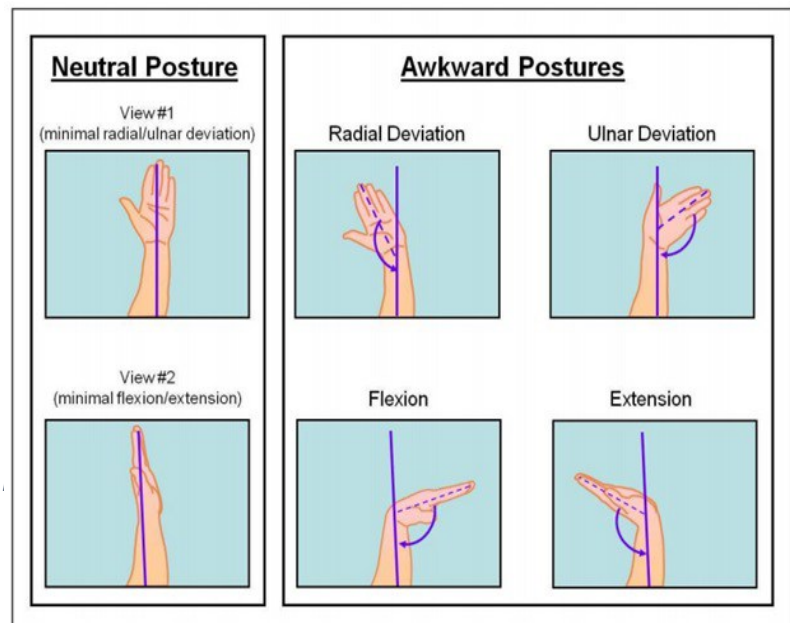


Figure 2.2: Show a human’s Neutral and Awkward Posture for the wrist (Ergonomic Plus)

Chapter 3: Project Scope

Chapter 3: Project Scope

Problem Solving

For this project test, the Six Sigma Methodology approach will be used. The week before testing the define phase was planned to be carried out. During this week information regarding the current replenishing process, sauce usage, sub-packaging design, and restaurants' layouts were collected and examined for understanding. Once these elements of the project were stated and defined, their importance to the overall project were measured. In this measurement, it was decided that the data analysis section and its results would be important to the senior project, because of the approximation of estimations. Suggestions would be given to Chick-fil-A in regards of how to obtain results from an economic analysis. The best replenish process, optimal layout for this process, and most efficient sub-packing design are important to present recommendation for Chick-fil-A. During the test, these elements are to be analyzed, so their problems and advantages can be noted. These problems and advantages are then examined, so that changes can be made to any of the project elements. These modifications are to be well documented, tested, and suggested. Once the recommendations are noted and presented to Chick-fil-A 's supply chain team, they will give feedback and decide which suggestions they want to validate and verify in the Nashville test.

Requirements

The requirements for this project were placed in phases to help keep track of which requirements needed to be fulfilled. The project phases are broken into 5 categories: Input, Data Collection, Testing, Revision, and Outputs.

For the Input phase the requirements are to have:

1. Chick-fil-A Innovation team objective
2. Senior Project required deliverables
3. Implementation of sub-packaging test

The requirements for the Data Collection phase are:

1. Fill out Field Data Time Collections Sheets
2. Gather Supply information from management

The requirements for the Testing phase are:

1. Document observation of employees
2. Document any observed changes or effects
3. Interview employees

The requirements for the Revision phase are:

1. Test suggested process model by implementation
2. Perform data analysis of time sheets
3. Create box design alternatives.

The requirements for the Outputs phase are:

1. Optimized process model
2. Standard set up to accommodate Replenishing process
3. Project Cost analysis
4. Box design Alternative

Gantt Chart

The Gantt Chart used this semester was formatted by six milestones. The first milestone was the Preliminary Details. The course requirements were the focus of this section. This includes finding a project topic, forming a team, and gather any project resources or contacts that will be needed. Below is the Gantt Chart representing this section.



Figure 3.1: Gantt Chart Preliminary

In the Initial Design Review, the project objectives and requirements were collected. This milestone marked the point where the project needed to head in a certain direction.



Figure 3.2: Gantt Chart IDR

The Preliminary Design Review was the point in the project where deliverables are defined and progress towards those items were being made.



Figure 3.3: Gantt Chart PDR

During the In-Progress Review, the project was on course. This period started on the exact day the Atlanta sauce test did. All test observations were made during this milestone. Each Senior Project member was visiting their assigned restaurant once a week for 30-days.

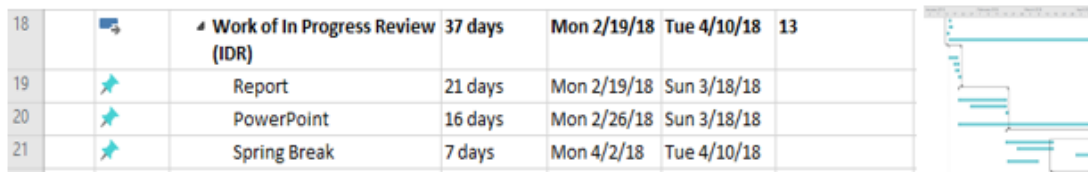


Figure 3.4: Gantt Chart In Progress Review

The Senior Project team was making final edits to their deliverables by the time the calendar hit the Critical Design Review period. During this period all deliverables were finalized and all requirements for Chick-fil-A were met.

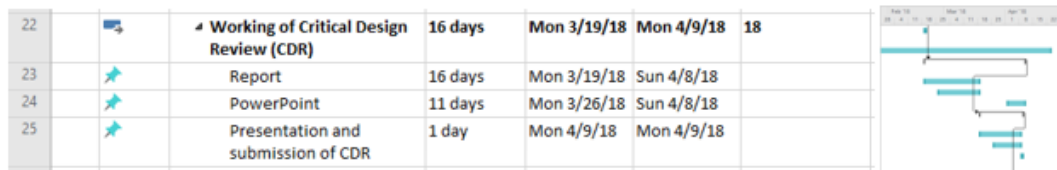


Figure 3.5: Gantt Chart CDR

The Final Design Review marks the end of this project. All Senior Projects and Chick-fil-A deliverables should be completed. This milestone is the end to the 76-work day project.



Figure 3.6: Gantt Chart FDR

Project Management

The Chick-Fil-A condiment project is currently being managed by Eric Stogner. James Bennette and Terence Ross are mentoring our team. Every other Friday during the project, the Senior team meets with these two engineers to update them on status of the project. At the end of the 30-day testing phase, the team will conclude with the analysis of the project with the innovation team and continue to finish the senior deliverables.

Budget

This 30-day test cost Chick-fil-A \$40,721.86. This cost includes a 30-day supply of sauces for all six restaurants and the cost for the copacker to repack the sauces in the new sub package and ship it to each restaurant.

Chapter 4: Testing Site Analysis

Chapter 4: Testing Site Analysis

The Layouts

The Atlanta sauce test was implemented in six restaurants. This analysis will only cover four of those restaurants. The four restaurants are Sugarloaf & 316, Sugarloaf Corp, Moore Rd., and Forsyth Collections. These restaurants were also split in two categories, Standard and Dine-Ready. Each restaurant was placed into one of these categories based off their front counter setup. All Chick-fil-A restaurants drive thru layout have a Dine-Ready layout.

Standard



Figure 4.1: Standard Layout (Larios)

The standard layout of a Chick-fil-A includes metal containers that store sauces, condiments, and cup lids. Figure 4.1 gives an example of what containers a standard layout has.

Dine-Ready

The Dine-Ready layout uses black plastic bins as containers for the restaurants inventory. The arrangement of these bins typically varies for each location but usually contain the same items. The average cost to make a Chick-fil-A dine-ready is \$4000. This estimate came from James Bennette. He informed the team that this information was given to him by College Hall of Fame Operator.



Figure 4.2: Dine-Ready Layout (Larios)

Drive thru

The drive thru layout is shown in Figure 4.3. This is the Chick-fil-A standard layout of all restaurants drive thru.



Figure 4.3: Drive Thru Layout (Smith)

The Test

The Atlanta Sauce test was schedule to be implemented in the metro-Atlanta restaurants mentioned above for 30 days. During these 30 days data collection sheets (Appendix D) were filled out by members of the senior project team to help collect data on the sauces. The employee behaviors and reactions to the newly implemented products was closely watched. Any effects on the replenishing process were noted and interaction with the product was also noted. All information was gathered to analyze specific details or problems with the test, so recommendations and modifications can be created.

Each sub-part in this analysis will describe each restaurant's replenishing process of the sauces.

Sugarloaf & 316 (Dine-Ready)

Replenishment Process:

All condiments are stored in the main back inventory. The sauce cases are taken to a staging room where one stocker scheduled during peak hour will fill empty bins with sauces. The drive-thru team member's will also stock between taking orders in the staging room. It takes a team member about 1 minute to stock the empty bins with sauces a condiment while not multi-tasking and 2 minutes while multi-tasking. This time estimated came from a high school research group doing time studies.

When a bin at the front gets low or runs out of sauces, a team member will bring that bin to the rear and exchange the empty bin for a full one. Table 4.1 shows this location data collection sheet filled out and Figure 4.5 show the data graphed.



Figure 4.4: Sugarloaf & 316 Staging Area

Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
10:00	Drive Thru	16	16	48	48	16	48	21
10:15	Drive Thru	16	16	48	48	16	48	21
10:30	Drive Thru	16	16	48	48	16	48	21
10:45	Drive Thru	16	16	48	48	16	48	21
11:00	Drive Thru	16	16	48	48	16	32	21
11:15	Drive Thru	32	16	48	48	16	32	21
11:30	Drive Thru	32	16	48	48	16	32	21
11:45	Drive Thru	64	32	48	48	48	32	21
12:00	Drive Thru	64	32	32	32	48	32	21
12:15	Drive Thru	32	32	32	32	48	32	21
12:30	Drive Thru	16	16	32	32	48	32	21
12:45	Drive Thru	16	16	32	32	48	16	21
13:00	Drive Thru	16	16	32	32	48	16	21
13:15	Drive Thru	64	64	64	64	64	16	21
13:30	Drive Thru	48	48	64	64	64	16	21

Table 4.1: Sugarloaf & 316 Bin Sauce Inventory

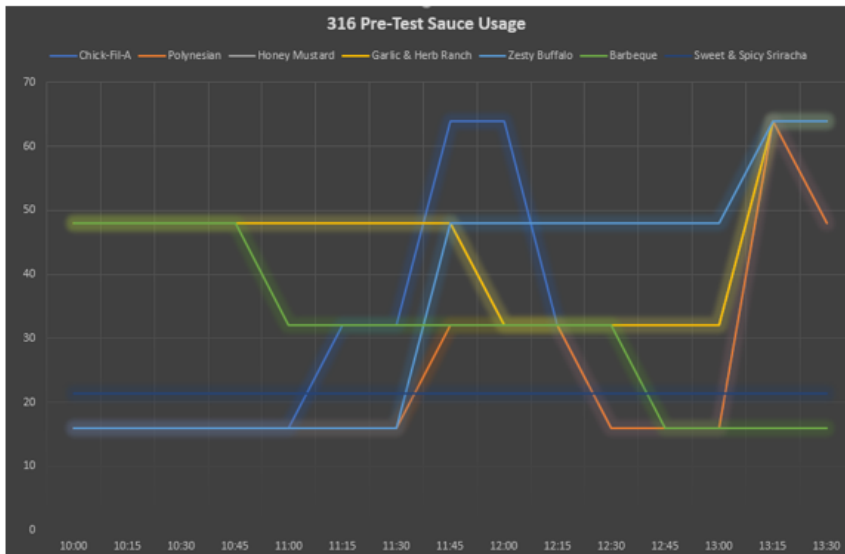


Figure 4.5: Sugarloaf & 316 Bin Sauce Inventory

Post – Test

The overall process has not changed but has become much quicker. Time to stock a bin has dropped from approx. 1-2 minutes to around 25 seconds. Team members are having to replenish bins more often, because of the sub-packing have less sauce content. They would like this product to hold more sauces if possible. The team members are also concerned with the sudden waste build up from discarding the sub-packing units. This location had a hard time opening the top to the inner pack.

Moore Road (Standard)

Replenishment Process:

This location does not have set restocking times, but instead a sporadic replenishing process throughout the day. One case of each of CFA, Poly, BBQ, and HM are kept under registers on front counter. Team members will stock by using partition sheets to carry rows or grabbing handfuls of sauces and distributing them to the needed bins. Other sauces such as Ranch, Zesty Buffalo, and Sriracha are carried on sheets by team members up to the front counter from the main back storage (Figure F.9).

All cases of sauces are stored in the main back inventory; there is no staging area at this location. Below are the data and corresponding graph for this location.

Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
10:00	Drive Thru	16	16	48	48	16	48	0
10:15	Drive Thru	16	16	48	48	16	48	0
10:30	Drive Thru	16	16	48	48	16	48	0
10:45	Drive Thru	16	16	48	48	16	48	0
11:00	Drive Thru	16	16	48	48	16	32	0
11:15	Drive Thru	32	16	48	48	16	32	0
11:30	Drive Thru	32	16	48	48	16	32	0
11:45	Drive Thru	64	32	48	48	48	32	0
12:00	Drive Thru	64	32	32	32	48	32	0
12:15	Drive Thru	32	32	32	32	48	32	0
12:30	Drive Thru	16	16	32	32	48	32	0
12:45	Drive Thru	16	16	32	32	48	16	0
13:00	Drive Thru	16	16	32	32	48	16	0
13:15	Drive Thru	64	64	64	64	64	16	0
13:30	Drive Thru	48	48	64	64	64	16	0

Table 4.2: Moore Rd. Bin Sauce Inventory

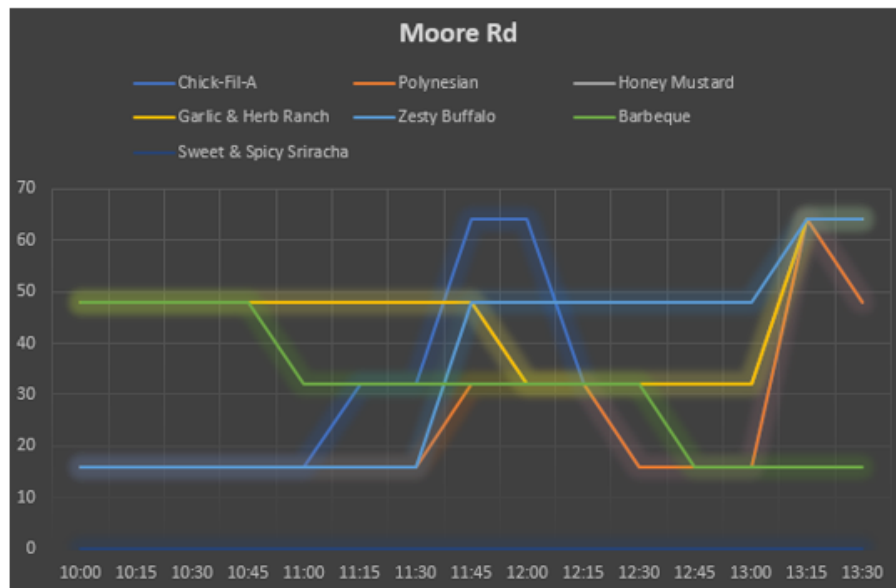


Figure 4.6: Moore Rd. Bin Sauce Inventory

Post – Test

Since the switch to the condiment inserts team members are loading the bins more frequently now, however, team members still like the new loading system because they’re no longer having to spend time loading the condiments by hand anymore. During the observation the easiest way to load the bins was to place the condiment insert in the bin then, rip the top off. Due to the new box design, the case boxes were unable to be stocked all the boxes on the shelf (Figure F.10).

Collections at Forsyth (Dine-Ready)

Replenishment Process:

This location does not have set restock times, it is a continual process throughout the day. Team members taking orders for the drive-thru will sometimes use the back-of-house staging area to take orders and there they will stock bins. Drive-thru will replenish from back staging area or pull bins from front counter when it is a busy period. One box each of CFA, Polynesian, Honey Mustard, and BBQ are kept under front counter registers. Zesty Buffalo, Ranch, Sriracha are kept in back-of-house storage and the boxes brought up when stocking. Front counter team members also replenish condiments (stacking in bins) when needed between orders.

It took approximately 1.5 minutes to walk to the back, bring up a stocked bin from the staging area and put onto the rack. When bins in the drive-thru needed replenishing, team members would empty the last few condiments onto the counter and take the bin back to the replenishing area.

Two data collections were carried out for the Collections location. This was done because out of the four restaurants this one had a largest customer base. The two tables and figures below show the movement of sauces during the observation duration.

Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
17:30	Drive Thru	58	50	66	66	66	66	33
17:45	Drive Thru	33	33	66	66	66	66	66
18:00	Drive Thru	17	17	66	66	66	66	66
18:15	Drive Thru	50	17	50	50	66	58	66
18:30	Drive Thru	17	8	50	50	66	50	66
18:45	Drive Thru	66	66	50	50	58	50	66
19:00	Drive Thru	33	58	33	41	58	50	66

Table 4.3: Collections Drive Thru Bin Sauce Inventory

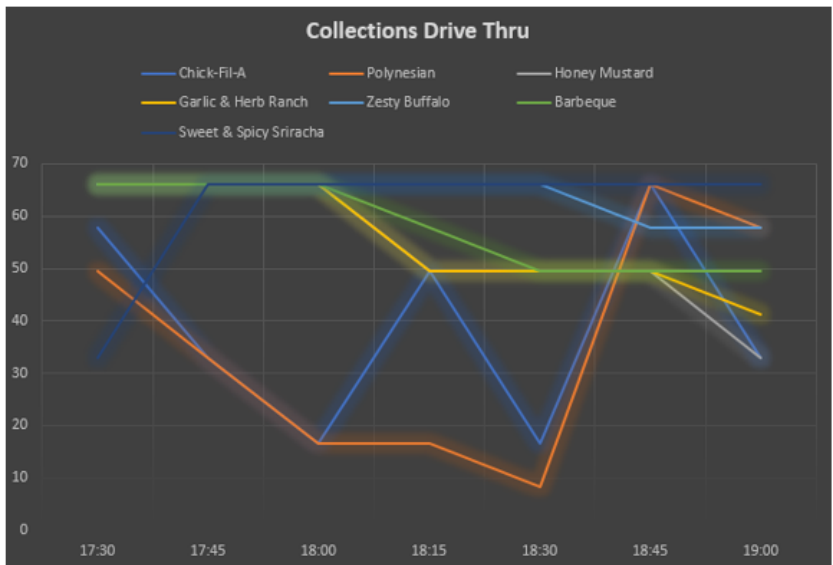


Figure 4.7: Collections Drive Thru Bin Sauce Inventory

Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
17:30	Front Counter	66	66	66	33	25	66	58
17:45	Front Counter	66	66	66	33	25	66	58
18:00	Front Counter	66	66	66	33	25	66	58
18:15	Front Counter	66	66	66	33	25	66	58
18:30	Front Counter	50	66	58	25	25	66	58
18:45	Front Counter	50	66	58	25	25	66	58
19:00	Front Counter	33	66	58	25	25	66	58

Table 4.4: Collections Front Counter Bin Sauce Inventory

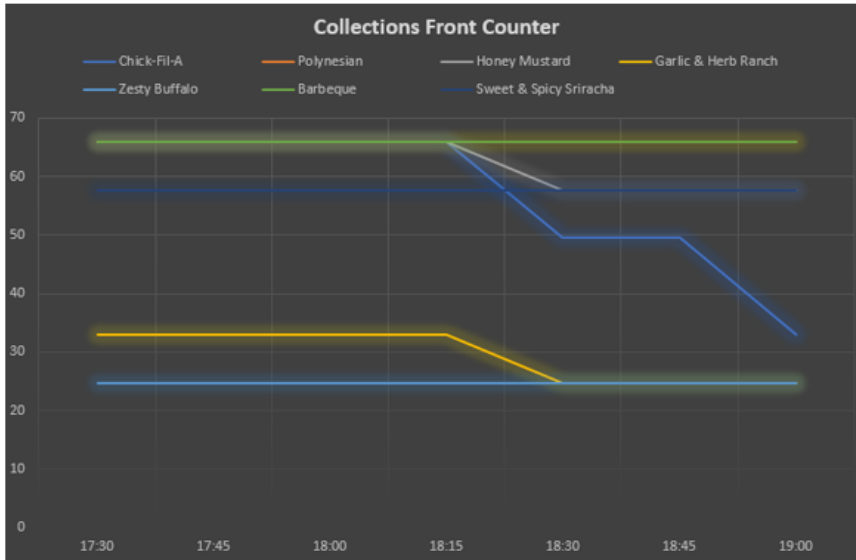


Figure 4.8: Collections Front Counter Bin Sauce Inventory

Post-Test

The new Process has eliminated the use of the staging area for stocking condiments, making the time to replenish a bin drop from approx. 1-2 minutes to around 15 seconds. Team members are having to replenish bins more often, but it is still faster than the previous way. Feedback for the team members included demands for an increasement of the sub-packing overall sauce count. An issue that also was presented was a large increase in waste from the sub-packing filling up the trash bins frequently.

Sugarloaf Corp (Standard):

Replenishing Process:

All condiments are stored in the main inventory storage area. Cases are taken out to the front counter where replenishing is needed(Figure F.11). A staff member who does not have an assignment performs this task. The staff member replenishing's sauces storage by taking the sauces directly from the case and placing them in the bins or holders. Drive thru staff radio's other staff members who aren't on a task to receive more sauces.

The table and figure below show the dynamic replenishing process of the sauces. These analyses showed a lot of movement was used just for sauces.

Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
11:00	Drive Thru	64	64	96	64	64	64	26
11:15	Drive Thru	43	43	96	64	43	64	26
11:30	Drive Thru	21	43	96	64	32	64	26
11:45	Drive Thru	21	32	96	64	21	43	26
12:00	Drive Thru	64	21	96	64	16	43	26
12:15	Drive Thru	43	16	96	64	16	21	26
12:30	Drive Thru	43	64	64	64	16	64	26
12:45	Drive Thru	16	43	51	48	8	43	16
13:00	Drive Thru	16	43	43	48	8	43	16
13:15	Drive Thru	16	21	43	48	8	21	16
13:30	Drive Thru	8	16	32	48	1	21	16
13:45	Drive Thru	8	8	32	48	1	21	16
14:00	Drive Thru	64	8	32	48	1	21	16

Table 4.5: Sugarloaf Corp Bin Sauce Inventory

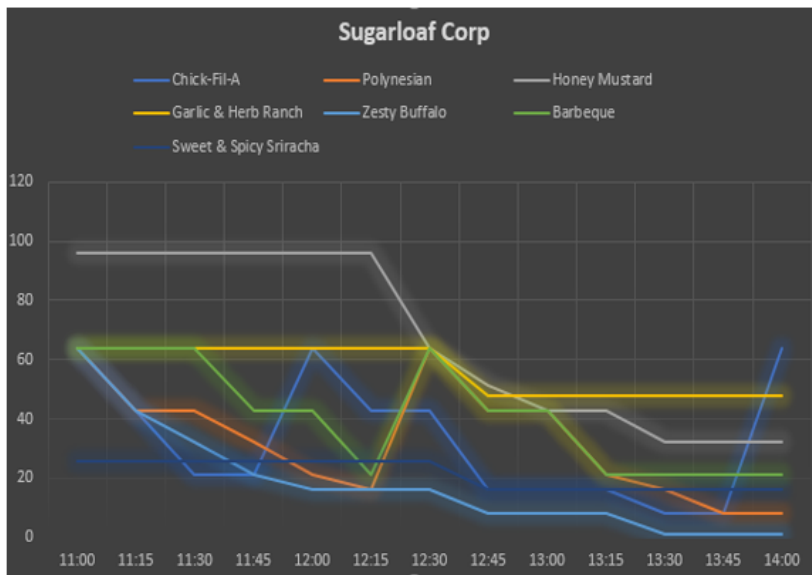


Figure 4.9: Sugarloaf Corp Bin Sauce Inventory

Post-Test

The front counter condiment set up is still the same and therefore it cannot accommodate the test. This impacts the test on the drive thru because when the drive thru condiment supplies is running low, the staff member sometimes go to the front counter where surplus stock is available to get more sauces. The first week the staff members didn't enjoy the new inner packs. During week two they grew accustomed to packs, gave great feedback on how it benefitted them and what changes might be necessary to help fully implement it.

The System

The condiment cycle in the overall Chick-fil-A supply chain system was noted during this the test. Figure 4.10 shows this lifecycle of the condiments during the 30-day test from production to disposal.

Chick-fil-A Current Condiment Life Cycle					
Suppliers <i>Parties involved</i>	Inputs <i>Service Offered</i>	Process <i>Stages involved in the process</i>	Outputs <i>Service Received</i>	Customers <i>Receiver of services</i>	
Production Company	Produce Condiments and package them into the initial boxes	Production	Condiment pack into boxes	Co-Packer	
Co-Packer (Atlanta Bonded)	Co-pack Condiments	Production	Condiments are repacked into the inner bin insert and then pack into a bigger box	Logistic Company	
Logistic Company (Colonial Cartage Corporation)	Transportation	Transportation	Boxes containing inner bin insert arrive at Chick-fil-a Store and are unloaded	Chick-fil-A Store	
Chick-fil-A Team Members	Labor	Stocking	Stock boxes containing inner bin insert in the stock room	Customer receives condiments	Improve Process
			Stock inner bin into condiment bins located at the Drive-thru and front counter		
Waste/Recycle Management company	Waste disposal	Waste	Disposal of empty boxes and inner bin insert	Waste/Recycle Management company	

Figure 4.10: Condiment System

This chart is divided by into the following sections:

- *Supplier* - the Parties involved in that process
- *Inputs* - the service offered by the supplier

- *Process* - the stages involved in the process
- *Outputs* - the service received by the
- *Customers* - the receiver of services

The red box labeled, “Improve Process,” marks the content/process in that row for being improved later in the project.

Chapter 5:
Box Design Review

Chapter 5: Box Design Review

In the box design review the design of the initial design of the inner and shipping packs will be thoroughly discussed. We will then discuss recommendations and alternative designs for both the inner and shipping pack.

Initial Test Design

Inner pack:

For the initial test the inner pack design selected was constructed of cardstock and designed to fit in the recommended ULINE ¾ bin (refer to Figure 5.1). The sauces were stacked flat and face-to-face. The reason for stacking the sauces face-to-face was to eliminate the need for the slip sheets that were previously used to transport sauces. The slip sheets allowed sauces to be stacked face-to-bottom without having to worry about the bottom of the sauce puncturing the



Figure 5.1: Current Inner Pack Design (Larios)

seal of the sauce underneath (refer to Figure 5.2). Perforations ran along the front, up the sides and down the length of the top to enable easy opening of the packs (refer to Figure 5.2). In Table 5.1 some of the strengths and weaknesses of the design that were discovered throughout the initial test will be summarized.

The labeling chosen for the testing phase consisted of a label placed on the back and side of the pack. The reason was so that it would not interfere with the perforations. For the test phase, because of cost reasons, black and white printing was chosen. The labels included the sauce type, vendor

tracking numbers, and the best by date. Throughout the test, the labels proved to be an issue. Due to the fact of having seven different types of sauces all stored next to each other in identical looking boxes, Team Members had difficulty discerning between closed boxes of sauces. This sometimes cause an increase in time taken to pull sauces from Back-of-House storage.

The way the sauces were stacked, each inner pack contained 48 sauces. This was a reduction in the amount of sauces that each bin on average contained. From pre-test observations, the average amount of sauces per bin when hand stacking was 60+ depending on the bin used. For the less popular sauces this was not an issue, but for the four most popular, it increased the amount of time per day they had to restock each bin. Although they saw an increase in amount of time needed to restock, the time saved from the packing was far greater than the time taken for the additional restocks.



Figure 5.2: Opened Inner Pack (Larios)

In the overall performance of the inner pack the strengths far outweighed the weaknesses of the design. The introduction of the inner pack reduced the average restock time per bin from 2+ minutes down to 20 seconds. After the first week of testing and getting acclimated to the inner pack, all team members interviewed preferred the inner pack to the previous process of hand stacking.

INNER PACK REVIEW	
<p>Strengths</p> <ul style="list-style-type: none"> • Reduced average stock time by 1:20 minutes per bin • Eliminates need to store full boxes in Front of House Storage 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Not efficient for non dine-ready stores • Reduces amount of sauces held in bin from an average of 60 down to 48 • Increase in Front of House Waste • Perforations were difficult to tare • Need Colored labels for quick discernibility

Table 5.1: Current Inner Pack Review

Shipping pack:

Inner packs were delivered to restaurants in shipping packs. Each shipping pack contained nine inner packs. Shipping packs held inner packs in a 3x3 configuration (refer to Figure 5.3).

Labeling was placed on the sides of the shipping pack. The label includes the sauce type, lot number and expiration date. Once again for cost reasons the test was run with black and white labels. With the labeling on the side it is not visible from the front when in storage which during the test caused confusion to team members when looking for a specific type of sauce.



Figure 5.3: Shipping Pack

(Larios)

Shipping packs were placed in Back-of-House storage where sauces are kept till needed in Front-of-House. The length of the shipping pack prevented them from stacking two deep in the Chick-fil-A standard 18” or 24” shelving. The height also prevented them from being stacked on top of each other. This caused some packs to be stacked improperly or in other areas which often caused confusion for team members when looking for a specific sauce.

SHIPPING PACK REVIEW	
<p>Strengths</p> <ul style="list-style-type: none"> • 1:1 ratio to current boxes • Allows Sauces to be more easily stored in Front-of-House • Easy transportation of inner packs 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Labels not visible when facing out • Need Colored labels for quick discernibility • Does not fit well in Back-of-House storage

Table 5.2: Current Shipping Pack Review

Containing nine inner packs, the shipping pack provided the same amount of 432 sauces per pack as the previous box. This allowed the restaurants to change their forecasting for sauces since each pack would provide the same amount of sauces. The shipping pack allowed restaurants to still order sauces easily in the quantities needed, but it also allowed them to be able to keep a small stock of sauces in small storage spaces in front-of-house, whereas the previous pack required a large space to store it. Strengths and weaknesses of the shipping pack are summarized in Table 5.

For additional pictures and box specifications see Appendix F.

Box Design Recommendations

Inner pack:

In reviewing possible alternative designs for inner packs, one design stood out as a potential candidate. By slightly increasing the dimensions (refer to Figure 5.4) and stack sauces “library style” (refer to Appendix F for pictures) you can increase the amount of sauces per pack from 48 to 56.

When stacking the sauces library style the the sauces will be facing the side of the inner pack. This will make it necessary for the inner packs to be shipped with the sides of the inner pack facing up and down inside the shipping pack to assist in the stability of the shipping pack.

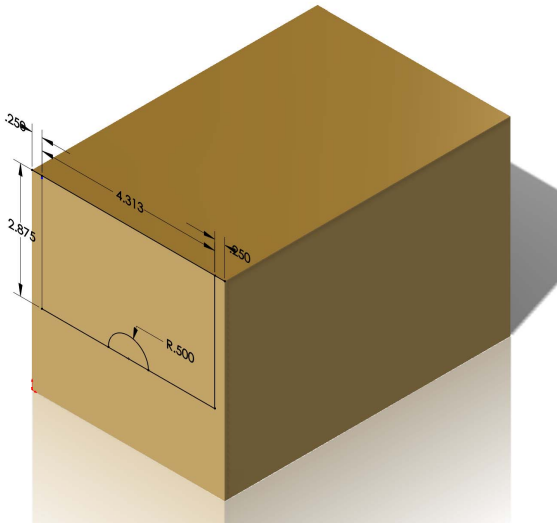


Figure 5.4: Inner Pack Alternate Design

Other recommendations include changing the perforations to help with the ease of opening the pack and color coating labels will greatly increase the efficiency of the inner pack.

Shipping pack:

In interviews with team members many asked if the shipping pack could be made shorter for them to carry easier. The other goal when reviewing possible alternate designs was to make the shipping pack fit efficiently in Chick-fil-A’s standard Back-of-House storage shelving.

The focus for the alternate shipping pack dimensions was based of the alternate inner pack. Using 18” shelving as the base shelving that will be used and the fact that the inner packs must be shipped on their side to avoid compromising the lids by stacking them on their side. It was found that four would fit in the width of the shelf. By stacking inner packs two high and four wide (refer to Figure 5.5) the inner dimensions of the shipping pack will allow them to be stacked two high. With the increase in the amount of sauces in the alternate inner pack, even

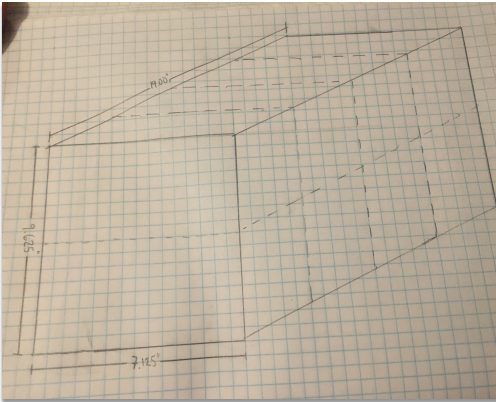


Figure 5.5: Alternate Shipping Pack (Larios)

though the amount of inner packs per shipping pack will decrease, the amount of sauces per shipping pack will increase from 432 to 448. Even with the increased number of sauces per shipping pack, the inner dimensions of the pack will decrease by an estimated 190 in^3 . The decrease in size will reduce the amount of back-of-house storage needed to store condiments.

Chapter 6:
Optimizing Replenishing Process

Chapter 6: Optimizing Replenishing Process

Standardized Layout

This section contains Chick-fil-A sauce replenishment process, Front counter, and Drive-Thru Proposed Standardized set-up. The current front counter set-up is displayed in Appendix F(Figure F.12). There is currently no standard Chick-fil-A set-up for any of their restaurants. The information it took to construct the propose set-ups diagrams were the frequency a Chick-fil-A employee had to reach for an item, the time it takes to retrieve the item and where the item is located.

FC1(Register) (Can be used as needed during the busy period or clocking in)		Drink Dispensers			
Small Cups	(Proposed) Storage for resupply sauces if the drive-thru is on the left side. If Drive thru is on the right side then store other supplies here.	Variable Cups Lids	Chick-fil-a	Polynesian	Variable Cups Lids
Medium Cups		Ketchup	Chick-fil-a	Polynesian	Ketchup
Large Cups		Honey Mustard	Ranch	Zesty Buffalo	BBQ

Figure 6.1: Optimal Standardized Front Counter 1 Set-up as a side view

Figure 6.1 displays the Front Counter 1 as a side view. As illustrated, if the Drive-Thru Location is located on the side where FC1 is located then the sauces resupply storage will be located here. If the FC1 is not located by the drive-thru then it should be considered an optional counter because it can be used for Employee clock-ins and to services customers during the busy periods of the day. For the storage bins section, cup lids are

located at the top of the bin. The reason is that it is easier and quicker in time to lift the lids

vertically than to pull them out horizontally. Chick-fil-A and Polynesian sauce have two bins on the top row dedicated to them because they are the most popular. Ranch, Honey Mustard, BBQ, and Zesty Buffalo are placed on the third self because they are not as popular.

The suggest layout for Front Counter 2 (FC2) and Front Counter 3 (FC3) is to have a team member designated them always during operation hours. The layout of these two counters are shown in Figure 6.2 below.

FC2(Register) (Primarily used to checkout customers at all time of the day)			Drink Dispensers				FC3(Register) (Primarily used to checkout customers at all time of the day)		
Small Cups	Storage for other supplies	Small Cups	Variable Cups Lids	Chick-fil-a	Polynesian	Variable Cups Lids	Small Cups	Storage for other supplies	Small Cups
Medium Cups		Medium Cups	Ketchup	Chick-fil-a	Polynesian	Ketchup	Medium Cups		Medium Cups
Large Cups		Large Cups	Honey Mustard	Sriracha	Zesty Buffalo	BBQ	Large Cups		Large Cups

Figure 6.2: Optimal Standardized Front Counter 2 and Front Counter 3 Set-up as a side view

In this layout Ranch was replaced by Sriracha, because Ranch is not requested as much as the other sauces. Therefore, it was deemed appropriate to place Sriracha there. Having one bin for Sriracha is suggested because as shown in the Test Site Analysis section, Sriracha is the least demanded sauce. This one bin has enough capacity to sustain the whole FC daily operation.

Drink Dispensers				FC4(Register) (Can be used as needed during the busy period or clocking in)	
Variable Cups Lids	Chick-fil-a	Polynesian	Variable Cups Lids	(Proposed) Storage for resupply sauces if the drive-thru is on the right side. If Drive thru is on the left side then store other supplies here.	Small Cups
Ketchup	Chick-fil-a	Polynesian	Ketchup		Medium Cups
Honey Mustard	Ranch	Zesty Buffalo	BBQ		Large Cups

Figure 6.3: Optimal Standardized Front Counter 4 Set-up as a side view

The figure to the left displays the Front Counter 4(FC4). This set-up is similar to FC1’s set-up. As illustrated, if the Drive-Thru Location is located on the side where FC4 is located, then the sauces resupply storage will be located here instead of FC1. If the FC4 is not located by the Drive-Thru is considered an optional counter. This front counter version mirrors FC1.

The in Figure 6.5, shows the current side view of the Drive-Thru(DT) counter. The proposed set-up for the DT is shown in Figure 6.4 and Figure 6.6. The Sauces are shown from right to left by the order of popularity. The right side of the DT is easier to access and Chick-fil-A employees can reach that area faster with less strain. Chick-fil-A and Polynesian sauces are position on the lowest level for this same reason.

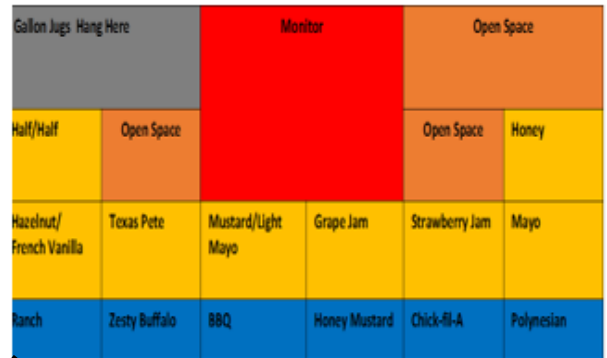


Figure 6.4: Optimal Standardized Drive-thru Counter Wall Set-up seen as a side view



Figure 6.5: Chick-fil-a Drive-thru Counter Set-up side view (C.Gilbert)

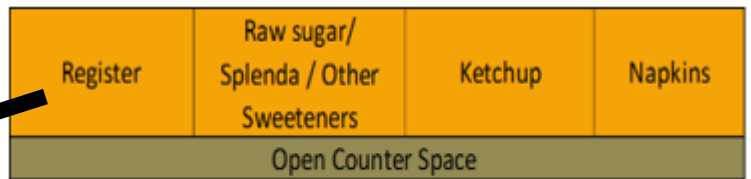


Figure 6.6: Optimal Standardized Drive-thru Counter Top Set-up seen as a side view

Optimized Process

During the sauce test, restaurants with the Dine-Ready layout showed a successful implementation of the new sub-packaging process. Their unique layouts proved that the black plastic bins are needed in every restaurant that this implementation will be placed at, otherwise the sub-packing units will be discarded and wasted.

While observing the two Dine-Ready locations, Sugarloaf & 316 and Forsyth Collections, their processes were recorded. Figure 6.7 below shows sugarloaf & 316 replenishing process of the sauces. Throughout the test, this restaurant continued to use their staging room to store the sub-packed sauces.

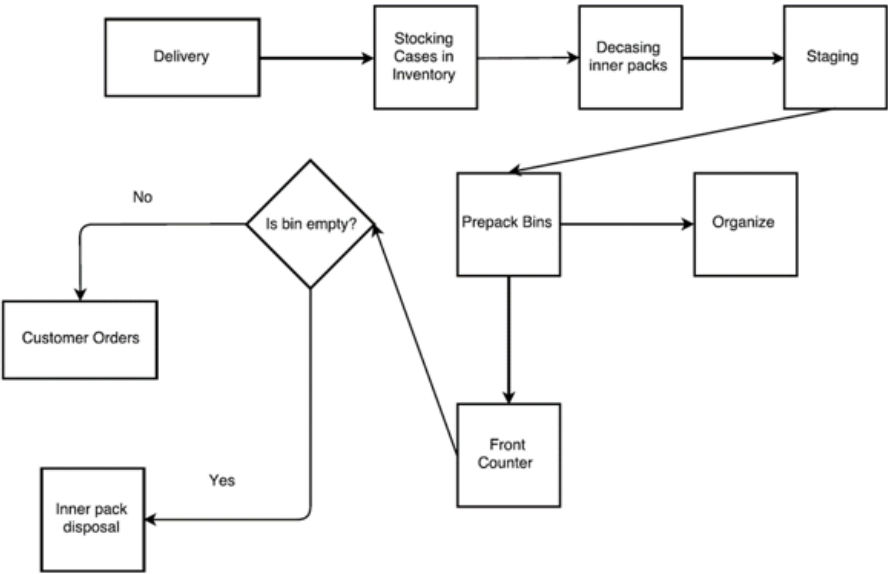


Figure 6.7: Sugarloaf & 316 Replenishing Process

The Forsyth Collections location had a similar setup as Sugarloaf & 316. While the test was being conducted and being analyzed at both locations processes, the staging room purpose diminished. The original purpose of the staging room was to store ready filled bins, which were stocked by hand. Once the inner pack was implemented, there was no need to prefill bins because of the convenience this product brought to the replenishing process. This scenario led to the removal of this part.

With the Operator’s permission, the staging room in process at the Forsyth Collections location was not used for a day. This modification produced the process shown in Figure 6.8.

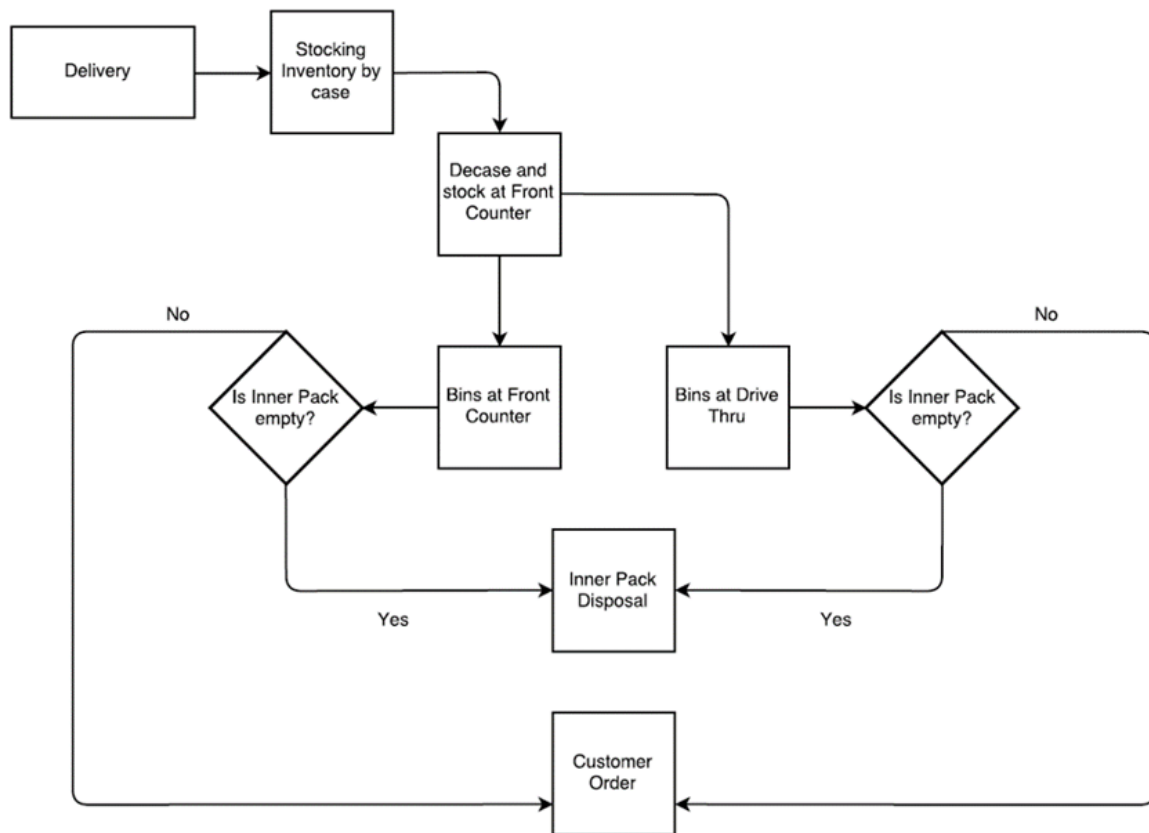


Figure 6.8: Forsyth Collections Optimal Replenishing Process

After implementing this new process, the Operator of this location gave positive feedback. According to James Bennette “this modification to the process decreased about 1 hour of labor time”. This location already had the most organized replenishing process observed in this project. With this new addition, the resulting process is caused this project’s optimal process.

A risk assesment was perform along with the creation of the optimazated replenishing process. This assement was executed to measrue the saftey of the process. Figure 6.9 shows the risk assesment of the current stocking and replenishing process.

Risk Assessment					
		Analyze	Improve	Control	
Goal	Problems	Cause	Effects to Productivity	Possible Corrective Action	Requirements Possibly Needed to fully Correct the Action
Maximizing productivity and reduce the time of Chick-fil-A Stocking process	Replacement of condiments frequency increase	New inserts contain 48 condiments vs Older way stock bins between 70 and 78 condiments	More labor time spent on restocking meaningless labor time at the Drive-thru and Front Counter	supply location and condiments in insert	Change restocking supply location or modify the amount the condiments inner insert can hold
	Difficulty Storing Boxes	New Over pack boxes are more vertical than the previous boxes	Less stocking area which increases labor time spent finding somewhere to stock them	Modify storage method or modify the box	Modify over the pack to resemble previous horizontal condiment boxes or find the correct Stocking method for maximizing space in the stockrooms
	Difficulty pulling from the bottom and New Columns as you progress through the inner insert at the drive through	How the bins are stored at the Drive-Thru station	Labor time spent trying to remove the condiment container.	Insert Modification	Rearrange how the sauce is stored for example library style
	Opening insert properly to reduce condiments from being drop on the floor	Improperly opening inner insert	Increase labor time spent opening the insert and the loss of good condiments	Train Staff on proper technique	Several team members stated they were not trained on how to open condiment insert box. The Shift supervisor's need to make sure everyone on his/her shift is properly trained opening the inserts
	Egress interference between team members while restocking sauces	Having to go to supply area to restock empty bins	Labor time spend obstructing other team members while walking to the stock room	Change restocking supply location	Have a light supply of condiments stock at the front counter
	Labeling	Labels are not visible depending on how the box is positioned	Employees are used to labels being colored code	Increase labor time spent trying to locate the label to find the proper condiment needed	Modify labeling
Color label		Add color to labels on over pack and insert			

Figure 6.9: Risk Assessment

The assesment has three phases which contains subsections. The phases are brokendown below:

- Analyze:
 - Identified the problems with condiment process
 - Identified the cause of these problems
 - Identified the possible effects on operations productivity caused by certain problems in the process
- Improve
 - Presents any possible corrective action to correct or ease the problems effect on the process
- Control
 - Relays information that is possibly needed to fully assist in the correct execute of the action

This assessment **is intended to be view as an assistant to the implementation of the optimized replenishing process.**

Chapter 7:
Project Cost Analysis

Chapter 7: Project Cost Analysis

An economical cost analysis was performed in this project, to help verify some of the Supply Chain team objectives. The first cost that was estimated was labor savings. This cost savings was one of the Supply Chain team’s goal for this test. With the implementation of the suggested optimal replenishing process, the operator and manager at Sugarloaf & 316 estimated an hour of labor savings per day. Using the average Chick-fil-A wages posted from Glassdoor, it was estimated that one labor hour is worth \$9 per hour. When collaborating this information, the Labor Savings table below was produced.

LABOR SAVINGS AT \$9/HR		
	Hours	Savings
WEEKLY	6	\$54.00
MONTHLY	24	\$216.00
YEARLY	288	\$2,592.00

Table 7.1: Labor Savings

The economical cost analysis of this project included Sugarloaf Corp and Sugarloaf & 316 to be used for comparison. These two restaurants were used because of their different layouts. Recapping from the data analysis, Sugarloaf & 316 identifies with the dine-ready layout, while Sugarloaf Corp. layout identifies with the standard layout. The sauce usage data gathered on both restaurants also have a similar time frame.

Using the sauce inventory data collected from Sugarloaf & 316 (Table 4.1). The sauce usage table was created.

Times	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
10:00	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0
10:45	0	0	0	0	0	-16	0
11:00	-16	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0
11:30	-32	-16	0	0	-32	0	0
11:45	0	0	-16	-16	0	0	0
12:00	-32	0	0	0	0	0	0
12:15	-16	-16	0	0	0	0	0
12:30	0	0	0	0	0	-16	0
12:45	0	0	0	0	0	0	0
13:00	-48	-48	-32	-32	-16	0	0
13:15	-16	-16	0	0	0	0	0
13:30	-16	-16	0	0	0	0	0
Sum	176	112	48	48	48	32	0
Daily Total	553	352	151	151	151	101	0

Table 7.2: Sugarloaf & 316 Sauce Usage

This table was made in Excel by using if conditions to sum the number of sauces in the bin when the sauce count dropped. This method insured that the sauce replenishes would not get count as expenses. Once the daily sauce usage was simulated, the yearly usage of sauces by case size was estimated in the table below.

		Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
Cases	Weekly	8	5	2	2	2	1	0
Cases	Monthly	31	20	8	8	8	6	0
Cases	Yearly	369	235	101	101	101	67	0

Table 7.3: Sugarloaf & 316 Sauce by Case Usage

Once the yearly usage for each sauce was accounted for, the information for cost per each sauce case was gathered from Chick-fil-A's sauce manufacturer. With the combining of this data the cost for sauce spending at this restaurant was able to be calculated. These calculations are shown below in the table below.

<i>Sauce Type</i>	Unit Price	Weekly Total	Monthly Total	Yearly Total
<i>Chick-fil-A</i>	\$32.61	\$250.53	\$1,002.11	\$12,025.33
<i>Polynesian</i>	\$24.68	\$120.66	\$482.63	\$5,791.57
<i>Honey Mustard</i>	\$26.89	\$56.34	\$225.36	\$2,704.37
<i>BBQ</i>	\$23.08	\$32.24	\$128.95	\$1,547.46
<i>Zesty Buffalo</i>	\$30.01	\$62.88	\$251.51	\$3,018.15
<i>Garlic & Herb Ranch</i>	\$26.04	\$54.56	\$218.24	\$2,618.88
<i>Sweet & Spicy Sriracha</i>	\$30.98	\$0.00	\$0.00	\$0.00
<i>Sum</i>		\$577.20	\$2,308.81	\$27,705.75

Table 7.4: Sugarloaf & 316 Estimated Sauce Cost

The revenue for this restaurant in 2017 was \$6,000,457. This amount was given by the operator.

The following tables use the same methods described above in Sugarloaf & 316 section to execute the cost analysis.

Times	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
11:00	21	21	0	0	21	0	0
11:15	21	0	0	0	11	0	0
11:30	0	11	0	0	11	21	0
11:45	43	11	0	0	5	0	0
12:00	21	5	0	0	0	21	0
12:15	0	48	32	0	0	43	0
12:30	27	21	13	16	8	21	10
12:45	0	0	9	0	0	0	0
13:00	0	21	0	0	0	21	0
13:15	8	5	11	0	7	0	0
13:30	0	8	0	0	0	0	0
13:45	56	0	0	0	0	0	0
14:00							
Sum	197	152	64	16	63	128	10
Daily Total	724	557	235	59	231	469	35

Table 7.5: Sugarloaf Corp Sauce Usage

		Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
Cases	Weekly	10	8	3	1	3	7	0
Cases	Monthly	40	31	13	3	13	26	2
Cases	Yearly	482	372	156	39	154	313	23

Table 7.6: Sugarloaf Corp Sauce by Case Usage

Sauce Type	Unit Price	Weekly Total	Monthly Total	Yearly Total
<i>Chick-fil-A</i>	\$32.61	\$327.71	\$1,310.84	\$15,730.10
<i>Polynesian</i>	\$24.68	\$191.04	\$482.63	\$5,791.56
<i>Honey Mustard</i>	\$26.89	\$87.64	\$350.57	\$4,206.79
<i>BBQ</i>	\$23.08	\$150.45	\$601.79	\$7,221.48
<i>Zesty Buffalo</i>	\$30.01	\$96.28	\$385.13	\$4,621.54
<i>Garlic & Herb Ranch</i>	\$26.04	\$21.22	\$84.87	\$1,018.45
<i>Sweet & Spicy Sriracha</i>	\$30.98	\$15.15	\$60.58	\$727.00
<i>Sum</i>		\$889.49	\$3,276.41	\$39,316.92

Table 7.7: Sugarloaf Corp Estimated Sauce Cost

This restaurant would need to spend an additional \$4000 to be dine-ready. This estimate came from Forsyth Collections Operator. If this investment is not made the sub-packing sauces will be a waste to this location, because they will be unable to use the new product ineffectively.

The revenue for this restaurant in 2017 was 5,545,899.

Conclusion:

The Labor Savings table showed an estimated yearly savings of \$2600. This is a small short-term savings to the overall revenue of a restaurant. Since the labor savings are meniscal, this benefit from the sub-packaging test should not be a major factor or justification for this implementation.

Sugarloaf & 316 had higher revenue than Sugarloaf Corp, but their spending on sauces were lower. The data collection table for Sugarloaf & 316 was missing data for the Sriracha sauce, but even with the implementation of this sauce cost, the restaurant still would have a lower spending on sauces. This scenario leads to the assumption that standard restaurants that are not dine-ready tend to use more sauces than needed because the setup makes it easier for employees to give extra sauces towards orders.

Chapter 8: Conclusion

Chapter 8: Conclusion

Test Conclusion

For Chick-fil-A to take full advantage of the condiment sub-packaging, it is necessary for most of the restaurants to have the Dine-Ready set-up option implemented. Without the implementation of the Dine-Ready layout, restaurants are not able to take full advantage of the inner pack, thus the eliminating any savings in labor and wasting money on a process that will never be used.

The optimal process that was recommended for the replenishing process will include the elimination of staging areas for condiments and the storage of inner packs in Front Counter storage to reduce the number of times team members must walk to Back-of-House storage to replenish. This process needs to have the recommended standardized setup implemented with it as well. This requires restaurants to invest in the Dine-Ready set up for Front Counter.

It is also recommended that Chick-fil-A change to the alternate inner and shipping pack designs. This will assist in the reduction of space needed to store condiments in Back-of-House storage while increasing the amount of sauces per inner pack thus reducing the amount of times that a team member needs to restock.

The implementation of these steps will greatly increase the efficiency of the replenishment process but will also move Chick-fil-A one step closer to the goal of reducing the space needed for Back-of-House storage and implementing Just-in-Time deliveries.

In addition to the data collected during the test for the verification process, there was one potentially major unforeseen benefit that presented itself. This was that because of the design of the box sauces were grouped together in twos. This actually unintentionally made it easier for the team member to grab the correct amount of sauces that Chick-fil-A has designated per meal. This resulted in a reduction on the number of sauces that team members were giving out per day which results in savings on food cost. The cost analysis showed signs of this finding through data. This finding is something that will be beneficial to focus on during the continuation of the project.

Looking to the Future

As Chick-fil-A continues with the sub-packaging project, the departments will take the information learned from the Atlanta test and apply it to the upcoming tests. The next steps in the project will include tests in the coming summer that will incorporate additional items alongside the current seven sauces in sub-packaging. The next tests will take place in the Nashville, TN market and the Macon, GA market. More tests will continue in increasingly larger scale as Chick-fil-A continues to test and validate the move to sub-packaging.

Gideon Larios will be continuing the project with Chick-fil-A as an Intern this summer to assist in the continuance of the testing and validation phase of the project.

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Appendices

Appendix A: Acknowledgements

The team would like to thank Chick-fil-A for the providing the opportunity for us to be able to work on a real supply chain industry project for our senior project. We would specifically like to thank the members of the Kitchen Design department for allowing us to work with them.

We also would like to give special appreciation to Eric Stogner for bringing us on as a part of the project and the project lead, Terence Ross of Ross 360 Business Solutions and James Bennette of Avondale LTD for the guidance and assistance provided throughout the project.

Thank you Dr. Adeel Khalid for the guidance provided to us throughout the semester.

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Appendix C: Reflections

This project was a unique learning experience. Previously to transferring to Kennesaw State I worked as a kitchen manager at Chick-fil-A of Dahlonega. This allowed me to be able to see the project not only from the eyes of an engineer, but also as the team member that will be affected by the project. This also allowed me to lend insight to the project from an operations perspective rather than just solely a supply chain mindset. During the pre-test and testing phases I was the primary observer for Collections Forsyth and also split observing time with Chris at Sugarloaf & 316. This included observing each restaurant twice per week. After the testing phase, we collaborated on the remainder of the project. Each of us had primary focuses on specific parts of the project that were our strengths. I was the primary on developing alternate solutions to the box designs. I also assisted in research and writing of the literature review, developing and testing the recommended replenishment process and writing the conclusion.

-Gideon Larios

The past four months have been a thrilling roller coaster ride. I did not at first know what expect going into this project. For four years I have spent most of my work experience and environment has been in distribution/fulfillment. Entering the restaurant business was a new level of experience for me, in which I highly enjoyed. During the testing period, I primarily observed Sugarloaf Corp. My responsibility to this project and my team was being the Project Manager. Some of my mains tasks included scheduling, keeping frequent contact with the team, assigning work based off individual's strengths and assisting my team members with of those assignments. The work I primary contributed was the data analysis from the collect data, the cost analysis, the Gantt Chart and formatting of the report. I assisted my team members by creating the replenishing process charts, creating outlines to help guide teammates with an assignment, and creating meeting layouts.

-Hannah Smith

These last four months, have been an experience I would have never image. Throughout this project I was tested in every capacity you could think of. I never knew so much engineering went in to the daily operation of a fast food restaurants. My group title throughout this project was Technical Coordinator. I was primary observer during the pre-test and testing phases for the Chick-fil-a Moore road location, split observations at Sugarloaf & 316 location and assisted with the Collection Forsyth location on a couple occasions. I never missed any assigned observation days during the whole project. Also, logged detail data of the sauce usages and performed time studies of employees by logging sauce stocking speeds and behaviors. After the testing phase, I accumulated all data obtained. Then, I constructed a Risk Assessment of the all issues discovered, created a SIPOC diagram to display all the components involved during the life cycle of replenishment process and SIPOC diagram Chick-fil-A's current Supply Chain process. As well as, use the data results from the test and outside research on human ergonomics to create a suggested optimal front counter and Drive thru counter set-up. In the Risk Assessment Chart and SIPOC diagrams, I was very precise in how the content was presented, detailed and organized. Color and non-engineering vocabulary was also, used to allow readers to follow to content with ease. I also, provide most of the literature reviews located in Chapter 2: Literature Review. Other tasks were to assist in the creation of the content in Chapter 1, Chapter3: Project Scope, Chapter 4: Testing Site and provided information for the Chapter 5: Box design Review. This has been some ride.

-Christopher Gilbert

Appendix D: Data Collection Sheets

Replenishing Times Data Collection Sheets:

Lunch Replenishing Times								
Sauces								
Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
11:00								
11:15								
11:30								
11:45								
12:00								
12:15								
12:30								
12:45								
13:00								
13:15								
13:30								
13:45								
14:00								

Dinner Replenishing Times								
Sauces								
Times	Area	Chick-Fil-A	Polynesian	Honey Mustard	Garlic & Herb Ranch	Zesty Buffalo	Barbeque	Sweet & Spicy Sriracha
17:00								
17:15								
17:30								
17:45								
18:00								
18:15								
18:30								
18:45								
19:00								
19:15								
19:30								
19:45								
20:00								

Field Study Time Sheet:

Field Study Time Sheet

Date: _____

Company: **Chick-Fil-A** _____

Location: _____

Team Members Present: _____

Shift: _____

Time Study Period: _____

Manager: _____

Department/Area: _____

Replenishing Time Summary

Sauces	Shift Quantity	Average (Unit is Case)	Start Time	End Time	Total Time
Chick-Fil-A		1 Day- 2 Day- 3 Day-			
Polynesian		1 Day- 2 Day- 3 Day-			
Honey Mustard		1 Day- 2 Day- 3 Day-			
Garlic & Herb Ranch		1 Day- 2 Day- 3 Day-			
Zesty Buffalo		1 Day- 2 Day- 3 Day-			
Barbeque		1 Day- 2 Day- 3 Day-			
Sweet & Spicy Sriracha		1 Day- 2 Day- 3 Day-			

Comments:

Appendix E: Chick-Fil-A Innovation Team Documents Submissions

Project Brief:

The Truett Dwarf Special: Project Brief

Hannah Smith / hsmith85@students.kennesaw.edu / 423.999.5754 / Team Project Manager
Gideon Larios / glarios@students.kennesaw.edu / 678.467.4580 / Team Resource Manager
Chris Gilbert / cgilber25@students.kennesaw.edu / 678.814.6084 / Team Technical Coordinator

Overview

The Chick-fil-a Supply Chain Innovation team have designed a new packaging method for their condiments and are implementing this method into selected restaurants. Their goal is to decrease used storage space in inventory, save daily labor times from organization, and reduce ladder usage.

Objective

Our personal goal for this project is to utilize our project planning skills, problem solving skills and statistical analyzation on a real-world supply chain implementation process, enough to make any critical recommendations.

Deliverables Required

The documents we plan to present to our professor are a total of four project progression reports and presentations. These reports will be combined into one final presentation and report at the end of the term. In this report we will include layouts of Chick-fil-a's inventory system before and after the implementation of the new packing process. To validate why Chick-fil-a Innovation team decided to create and implement this new process to the supply chain we will conduct research on at least two different supply chains who changed their packaging system for space and labor. Our team will also conduct real field time analysis of the packaging system before and after implementation to gather enough data to stimulate production times for comparison. In our reports we also plan to include a cost-effective analysis of the new process to help determine if the cost of the new packaging offsets the savings of labor cost organizing the current state of the condiment inventory.

Timeline (As of February 2018)

Initial Chick-fil-a On-Site Research Meeting	Completion Date: February 8, 2018
Completion of Preliminary Design Review	Completion Date: February 19, 2018
Chicken-fil-a On-Site Testing Research Meeting	Completion Date: February 23, 2018
Completion of Process Review	Completion Date: March 19, 2018
Completion of Critical Design Review	Completion Date: April 9, 2018
End of field studies	Completion Date: April 23, 2018
Completion of Senior Project	Completion Date: April 30, 2018

Project Progression:

The Truett Dwarf Special: Project Progression

Hannah Smith / hsmith85@students.kennesaw.edu / 423.999.5754 / Team Project Manager
Gideon Larios / glarios@students.kennesaw.edu / 678.467.4580 / Team Resource Manager
Chris Gilbert / cgilber25@students.kennesaw.edu / 678.814.6084 / Team Technical Coordinator

Overview

The Chick-fil-a Supply Chain Innovation team have designed a new packaging method for their condiments and have started implementing this method into six selected restaurants. Their goal is to see if this new product helped decrease used storage space in inventory, save daily labor times from organization, and reduce ladder usage.

Objective

After observing two weeks of the test, our team noticed some areas in the replenishing process that were unnecessary to the system functionality. Our team decided to apply the knowledge gained from our observations and studies from the past three weeks to optimize the entire replenishing system.

Deliverables Required

- Arena models for Collection and 316 Replenishing System Process non-optimized and optimized.
- A comparison report of the Systems that shows what material or supplies these stores have that makes the new sub-packing system work.
- A Bill of Materials report for creating a standardized setup for the new optimized Replenishing Process.
- A CAD drawing of the current box design which shows any designs flaws and a report accommodating that drawing to explain any recommends to the box design.
- An informational/operational video related to the project.

Timeline (As of March 2018)

Chick-fil-a Project Progression Meeting	Completion Date: March 2, 2018
Chick-fil-a Project Cycle Observation Collections Site	Completion Date: March 5, 2018
Project milestone Check-in with Professor	Completion Date: March 5, 2018
Tutoring in Area simulation from Dr. Robert S. Keyser	Completion Date: March 8, 2018
Completion of Optimized Replenishing Process	Completion Date: March 9, 2018
In Progress Review Presentation	Completion Date: March 19, 2018
Completion of Standardizing Process Setup	Completion Date: March 30, 2018
Completion of sub-package design report	Completion Date: April 6, 2018
Completion of Critical Design Review	Completion Date: April 9, 2018
Completion of Project Video	Completion Date: April 20, 2018
End of field studies	Completion Date: April 23, 2018
Completion of Senior Project	Completion Date: April 30, 2018

Appendix E: Restaurants Layouts and Processes

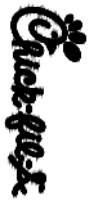
Stocking/Replenishment process for Sugarloaf 316				
Suppliers <i>Parties involved</i>	Inputs <i>Service Offered</i>	Process <i>Stages involved in the process</i>	Outputs <i>Service Received</i>	Customers <i>Receiver of services</i>
Chick-fil-A Members	Labors	Delivery	Condiment boxes containing 9 bin inserts are unloaded off the truck	Store
Chick-fil-A Members	Labors	De-case Inner Pack	Cases are loaded on to stock room racks	Stockroom
Chick-fil-A Members	Labors	Staging	Condiment inner inserts are taken out of the outer cases and transported to Staging room	Staging room
			Condiment inner inserts are loaded into all available bins base off the sauce label on the bin	Front Counter/ Drive Thru
Chick-fil-A Members	Labors	Transport full bin to the proper location in the store	Condiment inner inserts are transported to the front counter and drive-thru location	Front Counter/ Drive Thru
			All bins are fully stock at the Drive Thru and Front counter ready to be dispensed to customers	Front Counter/ Drive Thru
Chick-fil-A Members	Labors	Customer service at Front Counter/ Drive Thru	Condiments are dispensed out with customers' orders	Customer

Chick-fil-A Members	Labors	Replenish/Waste	When the bins run out team member removes empty bin, discard empty bin insert from the bin and return to staging room with the empty bin	Staging Room
			Fully stock bin is then removed and replaced with an empty bin to be restocked	Staging Room
			With Fully Stock bin in hand team member return to Front Counter/ Drive Thru and place bin where the original bin was in that area	Front Counter/ Drive Thru

Figure E.1: Sugarloaf & 316 Replenishing Process

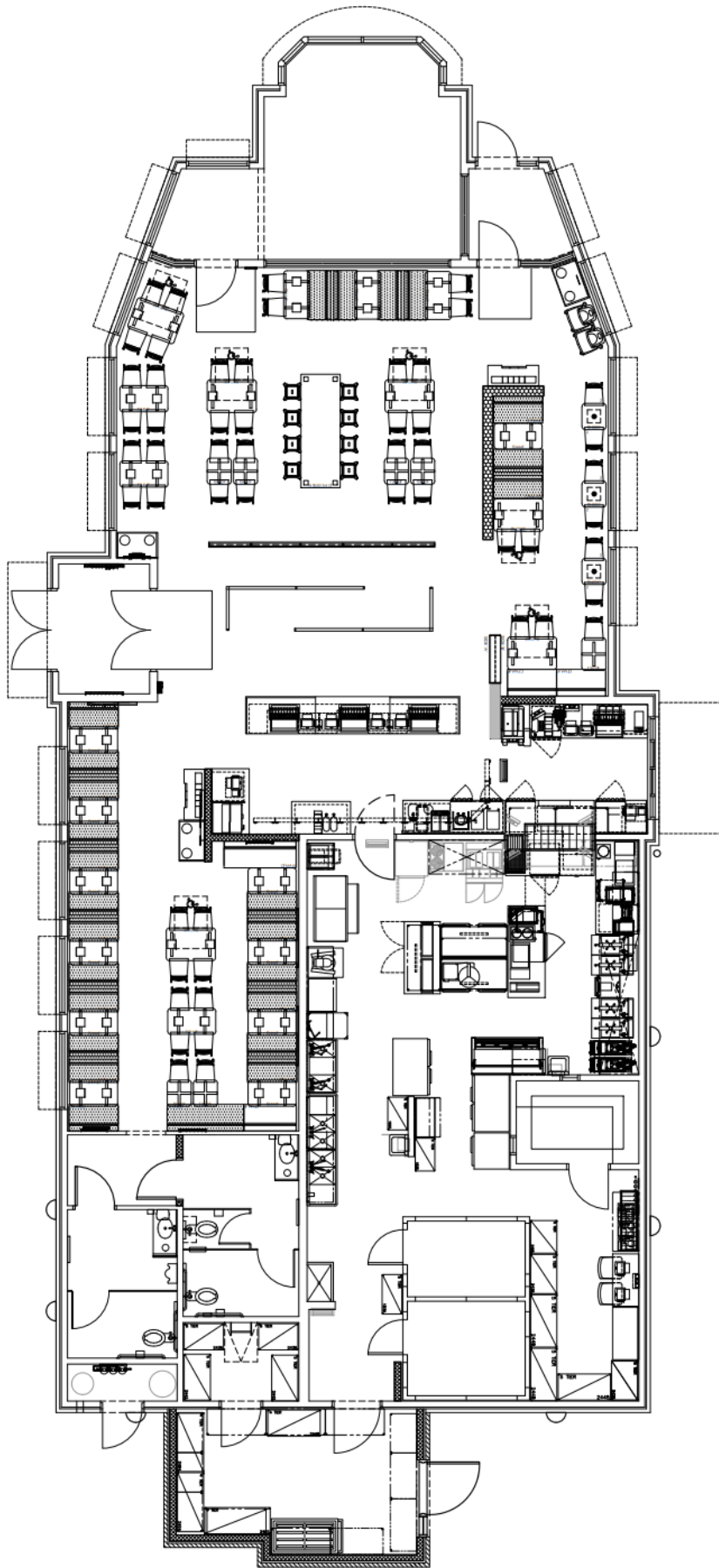
Stocking process for Forsyth Collection				
Suppliers <i>Parties involved</i>	Inputs <i>Service Offered</i>	Process <i>Stages involved in the process</i>	Outputs <i>Service Received</i>	Customers <i>Receiver of services</i>
Chick-fil-A Members	Labors	Unload truck	Condiment boxes containing 9 bin inserts are unloaded off the truck	Store
Chick-fil-A Members	Labors	Stocking Room	Cases are loaded on to stock room racks	Stockroom
			Condiment inner inserts are taken out of the outer case. Then loaded into all available bins base off the sauce label on the bin	Front Counter/ Drive Thru
			All bins are fully stock at the Drive Thru and Front counter ready to be dispensed to customers	Front Counter/ Drive Thru
Chick-fil-A Members	Labors	Front Counter/ Drive Thru	Condiments are dispensed out with the customer's order	Customer
Chick-fil-A Members	Labors	Replenish/Waste	When the bins run out team member retrieve's a new condiment insert and discard the empty insert	Process Repeat

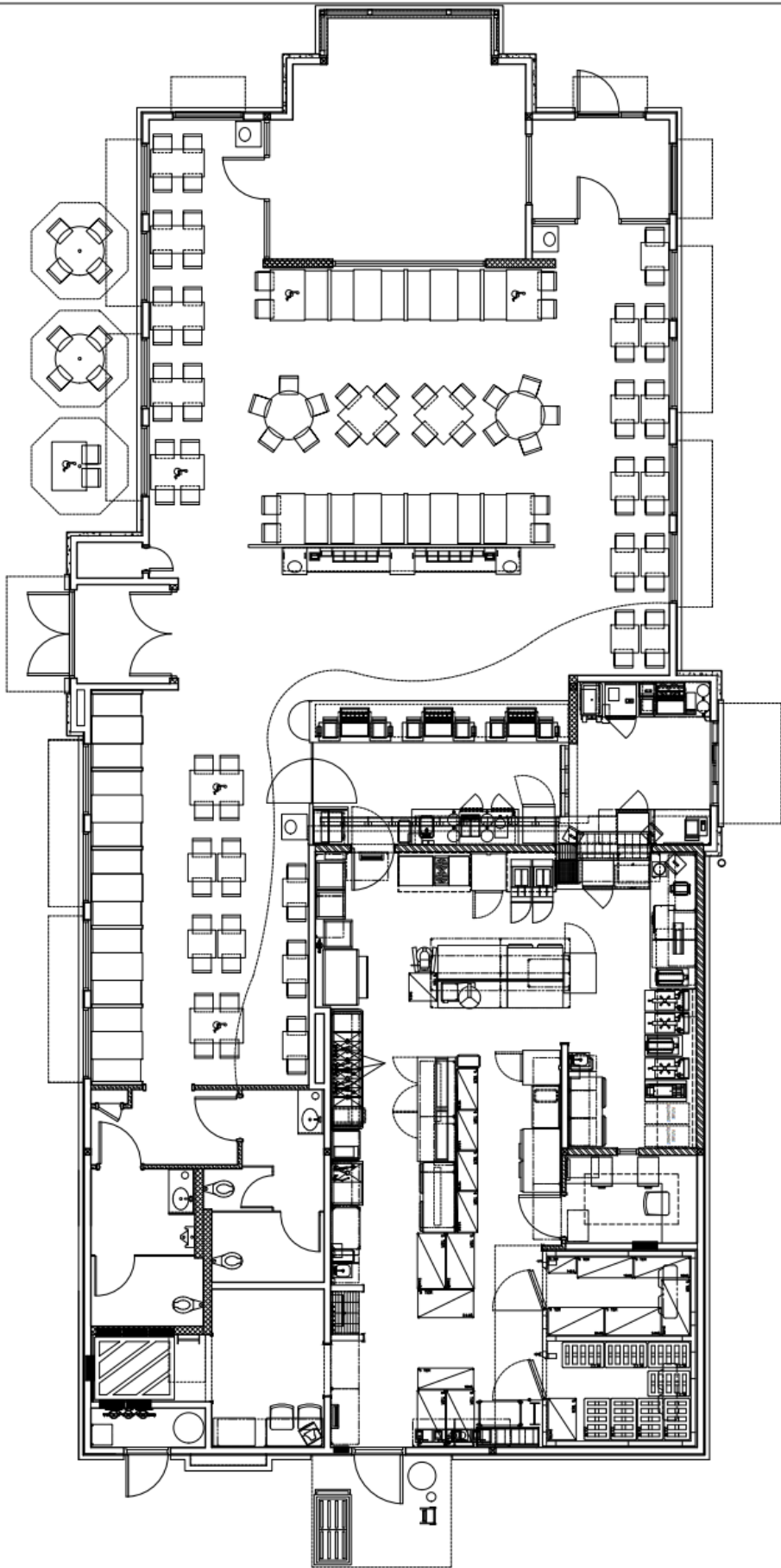
Figure E.2 : Forsyth Collections Replenishing Process



#01208 - Sugarloaf Corporate Center
Overall Restaurant Plan

1.0

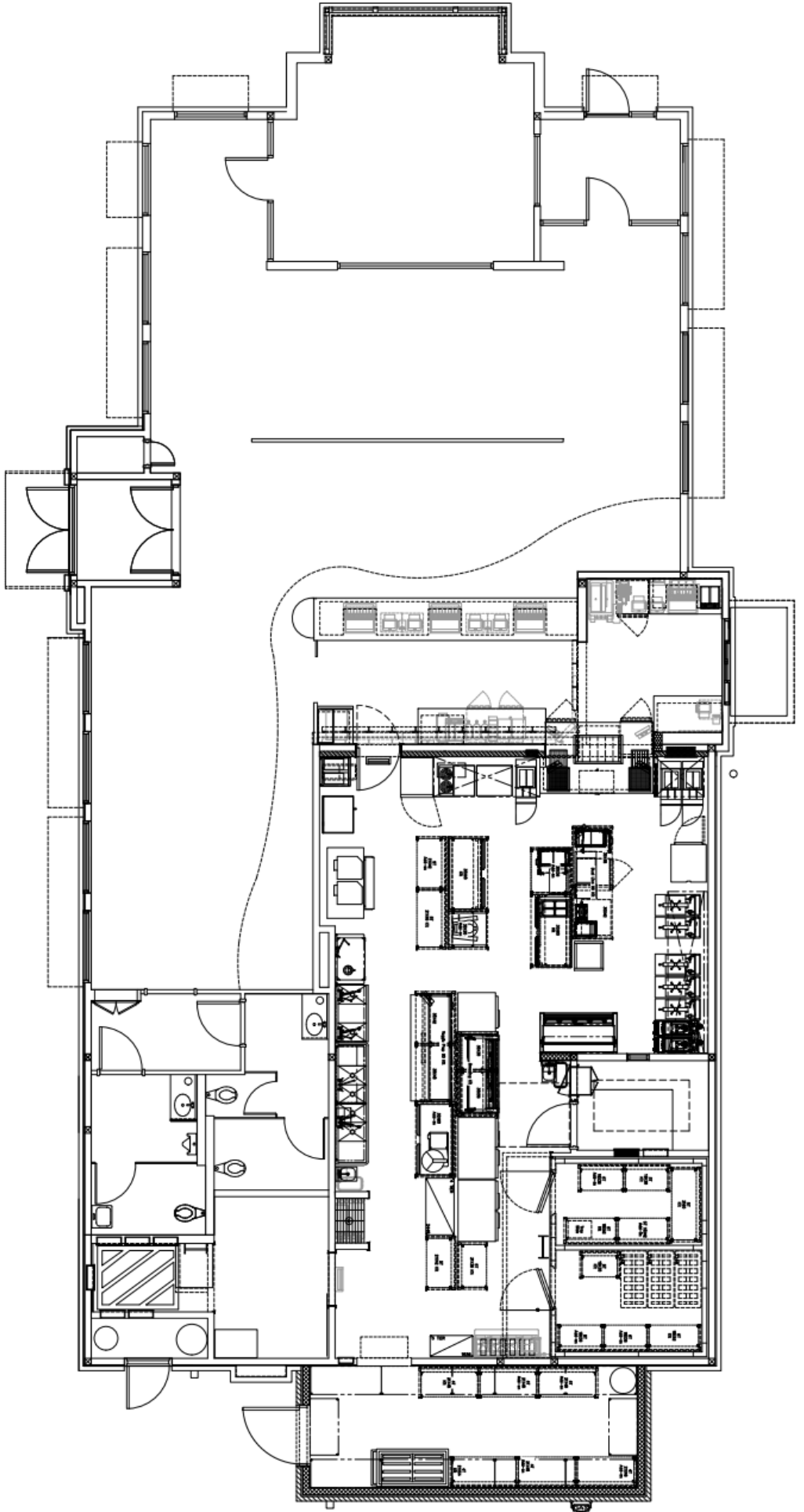






#02052 - Moore Road
Overall Restaurant Plan

1.0



Appendix F: Box Design Dimensions and Additional Pictures

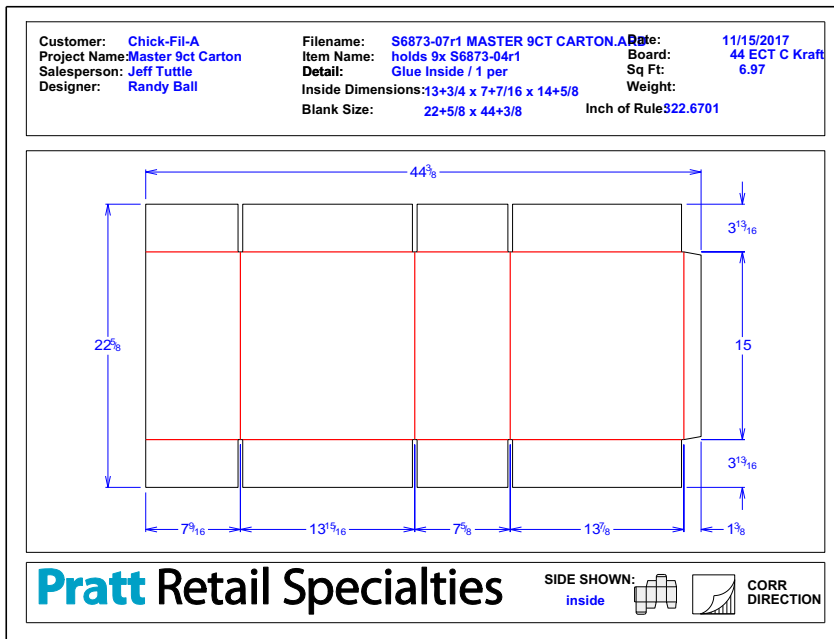


Figure F.1: Shipping Pack Dimensions

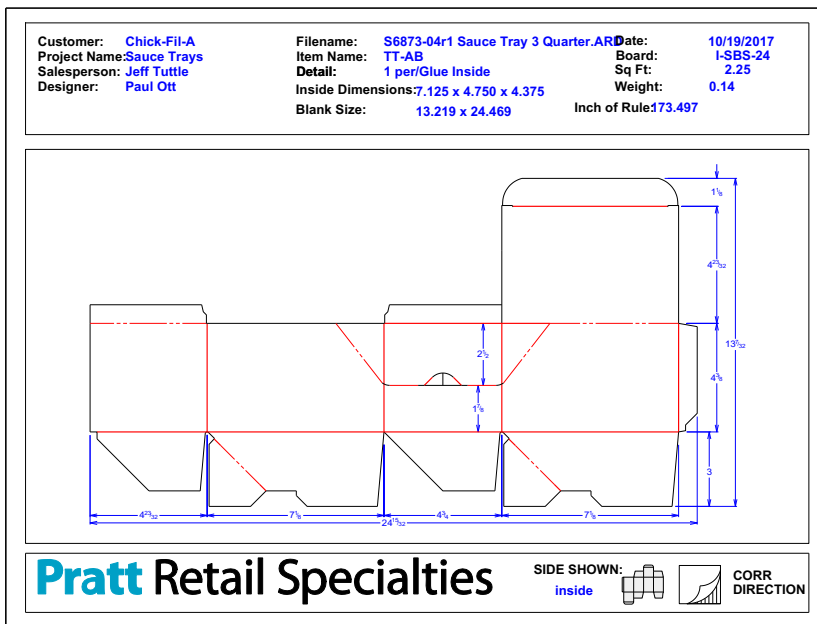


Figure F.2: Current Inner Pack Dimensions



Figure F.3: Library Stack (Larios)



Figure F.4: Storing Inner Packs in FOH storage (Larios)



Figure F.5: Front view of BOH Sauce Storage (Larios)

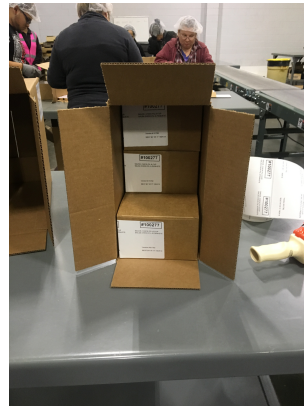


Figure F.6: Shipping Pack (Larios)



Figure F.7: Current Inner Pack in ULINE ¼ Bin (Larios)

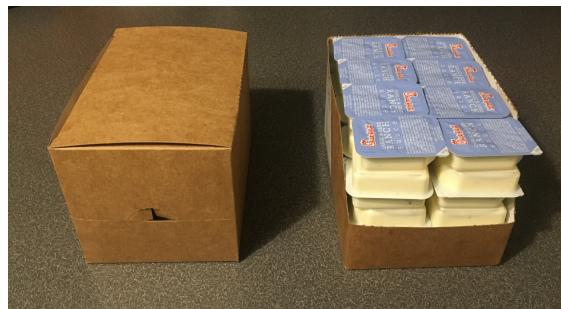


Figure F.8: Current Inner Pack Front (Unopened/Opened) (Larios)



Figure F.9: Standard Layout Replenishing (Smith)



Figure F.10: Case Size Issue (Gilbert)



Figure F.11: Standard Replenishing Issue (Smith)



Figure F.12: Current Front Counter Set-up as a side view (Gilbert)