

FORTUNE FILLING

Title: Fortune Filling

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Author: John S. Usher, PhD, PE
Professor
Department of Industrial Engineering
University of Louisville
Louisville, KY 40292

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Abstract:

This document is a case study that asks students to develop a plan for overall improvement of Fortune Filling Inc. The company has contracts in place to supply a variety of dry mixes to several major fast food chains. The products are blended and filled into plastic pouches that are then case packed and palletized. The company is operating in a leased facility and has developed many problems including: excessive fork truck travel, safety concerns, quality defects, poor space utilization, and difficulty in controlling inventory. The student is asked to develop improvements to the facility and its operation to eliminate or reduce the problems mentioned.

FORTUNE FILLING

1. INTRODUCTION

Fortune Filling Inc. has contracts with three large fast-food chains (MCD, KFC, and LJS) to supply dry biscuit mix, hotcake mix, and other blended flour products for their restaurants. There are ten different SKUs produced in the facility. Orders are shipped from Fortune Filling Inc. to six distribution centers (3 for MCD, 2 for KFC, and 1 for LJS) located within the region. Table 1 presents the average number of cases ordered by each distribution center each month.

TABLE 1 – Average Number of Cases Ordered per Month (over the past 12 month period).

Product (SKU)	Distribution Centers (customers)						Total Demand (cases/month)
	MCDA	MCDB	MCDC	KFCA	KFCB	LJSA	
MCD-001	6,600	5,400	8,000				20,000
MCD-002	4,500	4,500	4,000				13,000
MCD-003	1,200	3,500	4,300				9,000
MCD-004	900	1,700	1,800				4,400
MCD-005	600	600	1,000				2,200
KFC-001				9,200	6,800		16,000
KFC-002				3,100	2,400		5,500
KFC-003				600	600		1,200
LJS-001						10,300	10,300
LJS-002						2,000	2,000

Individual amounts within the body of the table can vary uniformly by $\pm 25\%$.

Customer orders usually consist of unit load (full pallet) quantities (60 cases/pallet) of the different products. Each of the six distribution centers gives Fortune Filling a two-week demand schedule with shipments occurring every 2-3 days. Orders to a given distribution center usually consist of full truckloads, though the smaller orders or expedited situations require shipment by less-than-truckload (LTL) carriers.

Fortune Filling currently operates only 1 shift per day and average 22 shifts per month. They fully expect a growth in demand over the next 3 years to average 5-8% per year, which may necessitate adding an additional shift.

2. THE PROCESS

A rough layout of the facility is shown in Figure 1. Below is a description of each specific area.

Blending

This is where flour, shortening, and minor ingredients (salt, spice, leavening agents, and preservatives) are blended into 2400 pound batches using four large ribbon blenders. Each blender station sits on a 10' elevated platform. The recipe for each product type is different, but for the purposes of this case study, the following "average" recipe is provided. A batch consists of approximately 1800 pounds of flour which is moved into the blender via pneumatic conveyance tubes from large silos outside. The other ingredients to be added to the batch are "kitted" onto a single pallet in the ingredient storage area, transported by lift truck into the blending room and then lifted up onto the elevated platform. Each "kit" usually contains 8-10 30-lb cubes of shortening, and 6-8 40-lb bags of minor ingredients. During the blend cycle, the operator must run each block of shortening through an extruder (mounted to the blender) which creates small pieces of shortening that fall into the blender. The platform operator must also manually add minor ingredients (1-3 bags of salt, 1-3 bags of sugar, 1 bag of leavening agent, and 1 bag of preservative) to the blender at various times during the blend cycle. One platform operator can handle two blenders. The batch is chilled during the blend cycle to a temperature of 54° F, which helps maintain the hardness of the shortening and also helps to prevent any type of bacterial growth. It is also critical to maintain consistent batch temperatures to ensure smooth flow of product later in the filling area. Once a batch completes the 20-minute blend cycle, it is deposited out the bottom of the blender into 3 cloth totes. One at a time, the discharge operator hangs a cloth tote from hooks under the blender discharge chute and fills it with 800 pounds of dry mix. A plastic pallet is used under the tote so that a lift truck can remove the load. A completed tote (which is approximately 36"x 36" x 48") is then moved out of the blending room (by the lift truck) and the discharge operator repeats the process. One discharge operator can handle 2 blenders. Thus there are a total of four operators in the blending room. Changeover from one product type to the other generally requires a 30 minute cleaning procedure using compressed air.

Holding

Totes are individually moved from the blending room onto storage racks where they are held until lab analysis is completed on the batch. Fortune Filling is required by law to take samples from each batch and conduct extensive lab tests to assure food safety. Batches have been averaging 4 hours in the holding area, waiting for test results, which results in a large volume of work in process. Currently about 5% of the batches are being rejected and are either reworked or scrapped. Many of the rejected batches have not had food safety problems, but instead are rejected due to excessive variation in the blend or temperature related problems. Many of these problems are caused by inconsistent procedures during the blending cycle and the excessive amount of time batches are spending waiting to be discharged from the blender. Three employees handle the testing activity. The company thinks that it may be possible to invest in an improved testing system to cut the test time to approximately 30 minutes, but there are many options available and they are not sure how large of an investment could be economically justified.

Filling

This area contains four form-fill-and-seal systems that package the dry mix into pouches each weighing 2 pounds. Totes are placed upon a lift and conveyor loop that raises the totes and dumps the dry mix into a large hopper that sits on top of each filling machine and returns the empty tote. Using an auger feed, the system deposits dry mix into a pouch made from a roll of plastic film, and then deposits the pouch onto a takeaway belt conveyor. Each roll of plastic film yields 1200 pouches. The conveyor feeds the pouches to automatic case filler that places 10 pouches into a case measuring 12" wide x 16" long x 12" high. Cases are automatically sealed, time/date coded with an ink jet printer, and sent to a palletizer at the end of each filling line. There they are palletized 12 cases to a layer, 5 layers high. Each pallet load contains sixty 20-lb cases and has a total dimension of 64" x 48" x 48". The full pallets from the four filling lines are sent to a single stretch wrapper. Finished pallets then are transferred by lift truck to finished goods storage. Each filling machine produces 120 cases per hour. Each machine has three operators: one to monitor overall machine operation, one to oversee the case filling, and one to oversee the hopper filling. Changeover from one product type to the other generally requires a 15-minute setup procedure (to change pouch material, ink-jet, etc.) and clean the filling head using compressed air.

Finished Goods Storage

Unit loads are block stacked three high in the warehouse area of the plant. Generally there is space for 16 rows (one for each of the 10 SKU plus space for honeycomb losses) each containing 8 stacks of pallets, for a total storage capacity of approximately 400 pallets. Customers require pallets to be shipped in date code order thus requiring unit loads to be handled using a FIFO policy. Orders are picked from the dock side of the stacks. Because of the variation in demand and in the overall production schedule, as well as unforeseen events, the company tries to maintain a 3-day supply of safety stock on each product.

Ingredients and Packaging Storage

Minor ingredients are generally received in pallet load quantities (24 bags/pallet) and haphazardly stacked in the area. Blocks of shortening (each about 12" cube) are received 32 blocks per pallet and are stored in a refrigerated area containing individual pallet racks. Shortening must be tempered in this area for at least 48 hours prior to use. All minor ingredients are purchased locally and are received within 2 days of an order being placed. Just in case, the company generally maintains a 3-day safety stock of minor ingredients. For the purposes of the case, assume that all products use the same types of minor ingredients, (just different recipes). Two workers handle shipping and receiving activities. Packaging materials include cardboard cases, plastic film, and other miscellaneous items. Generally there are about 10 pallets of these items stored in this area.

Other

The maintenance shop and cloth tote repair areas occupy space in the back of the facility. The ceiling is 22' high on the left side of the building and 18' high on the right.

3. MAJOR PROBLEMS

- Excessive fork truck travel by the three drivers throughout the facility.
- Inadequate safety, especially in the blending area. A worker was recently injured badly when a block of shortening fell from the blending platform.
- Quality problems due to cloth totes. Due to wear and tear, the cloth totes often leave small threads in the dry mix creating excessive customer complaints.
- Poor storage and space utilization of the wide variety of incoming ingredients.
- Difficulty in maintaining FIFO order of finished goods due to block stacking.
- Excessive scrap and rework of batches.
- Insufficient space for future growth.
- Difficulty in supplying packaging materials to the filling lines.
- Excessive number of batches waiting for testing

4. ASSIGNMENT

You are to develop a plan for overall improvement of this operation. It should be assumed that the company will remain in the existing facility. Due to the fact the space is leased, only minor changes to the interior walls of the facility should be considered and no expansion of the existing facility is possible. Individual pieces of equipment may be moved, though expense for such moves should be considered, especially the blenders which are very large and intricately connected by piping and controls to the silos outside.

Project deliverables are to be specified by the instructor.

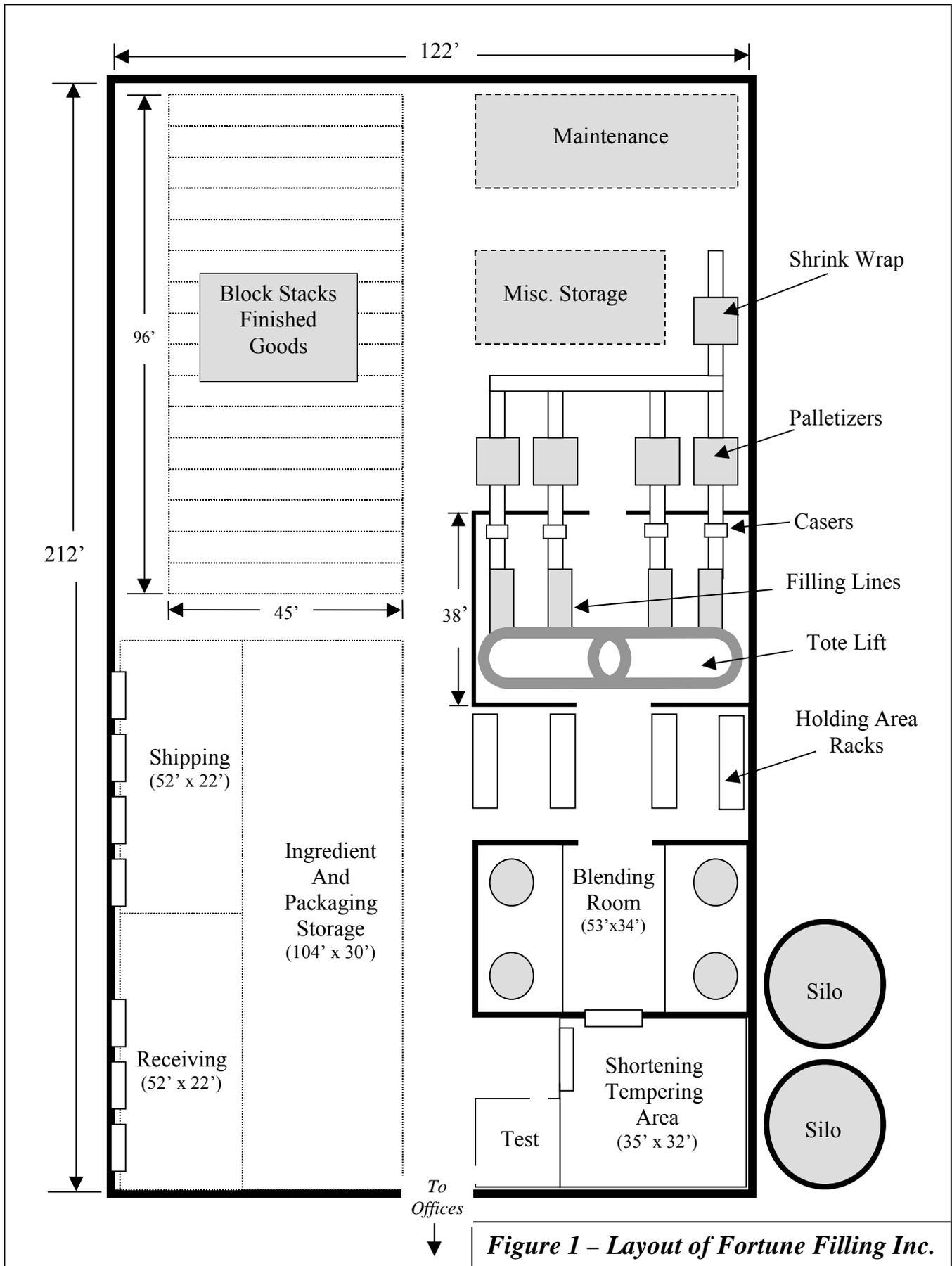


Figure 1 – Layout of Fortune Filling Inc.