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Barilla Mixed Pasta Reduction

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Barilla Mixed Pasta Reduction

Problem Statement

Barilla is an international producer of pasta with locations in nine different countries. The production facility we are working with is located in Ames, Iowa. They produce around 140,000 tons of pasta per year.

The problem Barilla is having is pasta is being spilled somewhere during the process of moving along conveyors and buckets while being transported from production to the storage silos. Barilla is striving to reduce the amount of waste they experience through spillage. The main loss comes when they get mixed product in a silo and are forced to scrap the whole silo.

Barilla is not sure exactly what is causing the spillages and want to know if the losses can be reduced or eliminated completely. Reducing the amount of spilled pasta would save Barilla money in waste and delayed production. Scrapping an entire silo not only wastes all the pasta in it, but also causes Barilla to push back other pasta's scheduled production to replace the lost.

Disciplines

Bioresource and Agricultural Engineering | Industrial Technology

Department of Agricultural and Biosystems Engineering (ABE)

TSM 416 Technology Capstone Project

Barilla Mixed Pasta Reduction

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1 PROBLEM STATEMENT

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Business Case Statement

- A. Pasta is being spilled while it is travelling from the production area to the storage silos.
- B. It is not known exactly where the spillage problem is or how it is getting back into the system after cleaning.
- C. From our observations, one area of spillage appears to be when pasta is dumped from buckets into other buckets or onto conveyors.
- D. This problem presents a good opportunity to reduce the amount of lost potential profit stemming from the pasta spillage, resulting in mixed product.
- E. The Ames Barilla plant cares about this project because it is directly affecting their business. Since Barilla is a global company, facilities in other countries may also be experiencing similar issues.

2 GOAL STATEMENT

The goals we plan to achieve in this project are to identify what parts of the production line are allowing pasta to escape the system, which leaves it to possibly return to the system during a different pasta's production.

We chose our recommendations by factoring in the estimated cost as well as the ease of implementation. Each solution had to show potential to keep pasta from escaping the line. Our tangible deliverables are our main two recommendations, even though we cannot implement them ourselves. For intangible deliverables, our solutions could potentially be implemented in similar Barilla plants around the world, which would be a benefit to the company on a much larger scale. Since it is a food safe production facility, we were not able to actually implement our solutions ourselves, but Barilla's managers can decide whether or not to implement what we have proposed.

Main Objectives

The main objectives we focused on were to identify areas where pasta leaves the system, provide an explanation to Barilla on why we believe these areas are causing spillage, and present our designs and recommendations to fix areas leading to the issue of mixed product.

3 PROJECT PLAN/OUTLINE

A. Methods/Approach

- o **Reference Material:**
 - o The main reference materials that we used were from Megan and Seth who are our contacts at Barilla. They provided a large amount of background information and assistance on this project.
 - o Dr. Kurt Rosentrater was our faculty mentor and used his background in grain handling to assist us.
- o **Data collection:**
 - o Visiting the Ames Barilla production site on multiple occasions allowed us to observe the issue as well as to take videos and pictures.

- o **Skills:**
 - o We utilized a variety of skills to successfully analyze the problem and develop possible solutions. One of the biggest skills we used was gaining an understanding of how they move the pasta. CAD skills were also needed to be able to develop and show the design ideas.
 - o One of the classes that was a big help to us was TSM 216. This class taught us how to use the CAD program Inventor so we could draw the design that we come up with.
 - o **Solutions:**
 - o After discussing and researching the possibilities of many potential solutions, we narrowed our recommendation to just two.
 - o We looked into locking the buckets in place so they are not continually moving after dumping, we believed this would prevent pasta from staying in the buckets. We eventually realized this was not viable because of price and amount of changes necessary.
 - o We looked into adding a 30-degree angled piece onto the flaps between buckets to prevent the potential of pasta settling on the flat surface and dropping out of the system. We decided against this because of the time required to change to the new design.
 - o The best of our two recommendations is to attach a rubber funnel on the end of the conveyors so the flow of pasta is better concentrated into the silos and reduce the amount that misses the silo opening.
 - o Our other recommendation is to change the design of the current conveyor side guards to better keep pasta on the conveyor and away from the sides where it could potentially get mixed with other product.
 - o **Organization:**
 - o Our group had formal meetings twice a week for one hour each. During that time the group reviewed weekly tasks completed and assign new tasks for the upcoming week. We also often met outside of our scheduled time to either work on the presentation or to visit Barilla.
- B. Results/Deliverables**
- o Our deliverables are the solutions we have provided above so Barilla can choose which, if any, they would like to implement in the future or have an upcoming capstone group consider further.

4 BROADER OPPORTUNITY STATEMENT

The broader opportunity of this project is that, through the changes we suggest Barilla implements at this facility, we can potentially help improve how the company runs its pasta production. Also, our ideas are relatively simple and straightforward so anybody who looks at them should be able to understand why we made these recommendations. Our ideas were originally to either lock the buckets open and to add sheet metal guards to better catch the pasta as they transition various belts, buckets, shakers, and

bins. After further research and studying the problem, we decided locking the buckets would be far too labor intensive and expensive to change. We instead pivoted to focus more on a rubber funnel above the silos and better sheet metal rails for the conveyors.

The way Barilla transports their pasta is similar to how grain facilities transport their grain, by using bucket elevators and conveyor belts. One concept we thought about to improve Barilla's process is by trying to adopt some things that the grain facilities do to reduce their spilling. Many grain facilities tend to utilize side rails on their conveyor lines to keep all the grain on the line and funnel shaped tips to reduce the amount of spread when dumping.

By reducing the amount of pasta escaping the system's designed transportation line, it also decreases the amount that could potentially return to the system when a different pasta is running. This would overall decrease the amount of mixed product and reduce the number of scrapped silos.

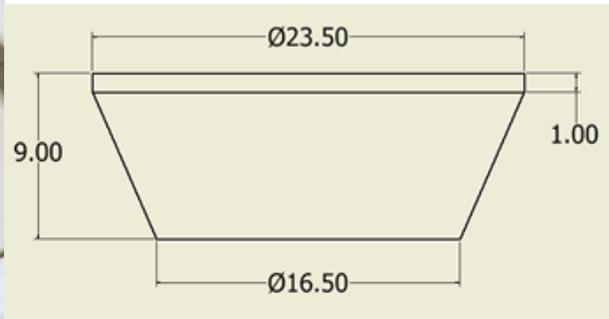
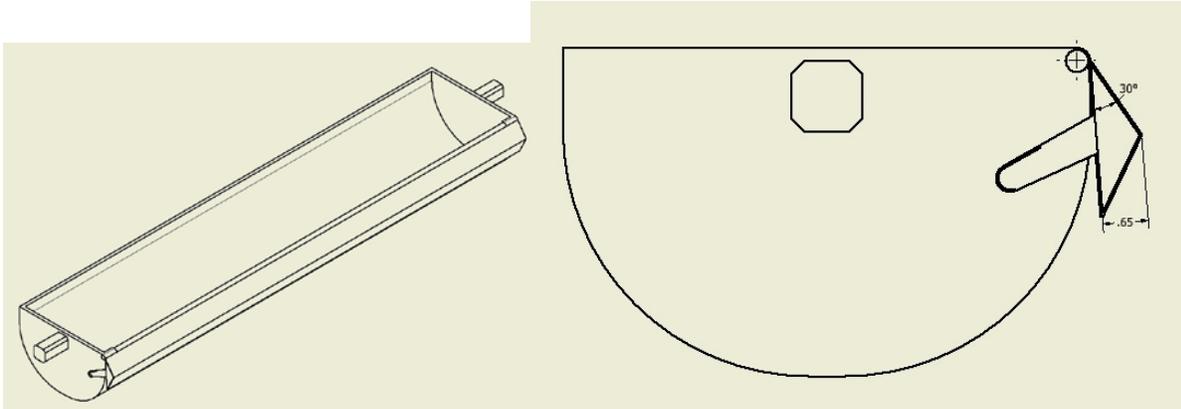
5 PROJECT SCOPE

The boundaries that we faced during this project included the area that we were looking at and what line of pasta we were working with. We also had to deal with the problem that we could not implement any of our designs because of the food safety regulations that are involved in the plant. We also would have had to stop the entire process to implement any of our design ideas.

For our project, we were working on the pasta production short lines. This part of the plant had a total of 4 production lines. The specific part of the process we were looking at was the transporting of the pasta from the dryers to the storage bins before it was to be moved to the packaging.

We were not involved in many different parts of the process. We had nothing to do with the cooking or the packaging of the short line pasta. We are also not involved in either of the two long lines of pasta. We further limited our area of focus to the top bucket and belt conveyors where the pasta is sorted to its proper bin.

6 GRAPHICAL ABSTRACT



7 APPENDIXES

