PROBLEM STATEMENT
Archer Daniels Midland is in need of a fully functional training facility to help employees and students understand the operations involved in processing edible beans. We have designed a small scale processing facility to be later installed by future capstone students in the ADM Ag Innovation Center. In addition to designing a facility layout, we will demonstrate the operation of the processing equipment through the use of video and product samples focusing on the education, design, and promotion of edible bean processing facilities.

EDIBLE BEAN PROCESSING FACILITY LAYOUT

FACILITY LAYOUT EXPLANATION
Constraints:
- Facility needs to fit in building size length 60’, width 30’, height 16’
- Equipment required: Cleaner, destoner, gravity table, color sorter, conveyance, elevating, and storage equipment
Product Flow:
A. Grain entry point from truck
   - Grain is unloaded then elevated by a continuous cup elevator (1)
B. Storage bins
   - 4 product storage bins emptied by magnetic vibratory conveyor (2)
C. Continuous cup elevator
   - Elevates grain above equipment
D. Cimbria cleaner
   - Separates stalks, pods, and splits from good product
E. Vibratory conveyor
F. Destoner p-leg
   - Elevates grain from vibratory conveyor
G. Destoner
   - Removes unwanted high weight material (dirtballs, rocks, glass, etc.)
H. Primary gravity p-leg
I. Primary Gravity
   - Separates product into 3 cuts based on density
J. Secondary Gravity
   - Re-runs the middle product from the primary gravity to increase efficiency
K. Color sorter
   - Removes off colored beans
L. Loadout bin
   - Product emptied off CCE into storage bins for packaging or reprocessing

CHALLENGES FACED
Challenges with the construction of this facility we incurred were:
- Time constraints
- University construction rules and regulations
- Certification for welding and wiring

ALTERNATE SOLUTIONS
Other options considered included:
- Mini scale facility
- 3D model of planned facility
- Education of edible bean facilities

BUDGET & SPONSOR INFORMATION

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Display Board</td>
<td>$250</td>
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<tr>
<td>Leg Sensor System</td>
<td>$5,100</td>
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<td>Total:</td>
<td>$5,350</td>
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Sponsor:
Adam Schmidt
Archer Daniels Midland Company

EDUCATION
In addition to a facility layout design, the following were created to provide students with edible bean processing facility knowledge:
- Grain flow display board
- Equipment video demonstrations
- Hazard monitoring demonstrations
- Equipment descriptions

FIGURE 1. COLLECTING SAMPLES
FIGURE 2. LMC DESTONER

Special Thanks to: Joe Gosche
Technical Advisor: Dr. Patrick Murphy