Bag Handling Optimization

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Introduction
The Scenario: MilliporeSigma currently uses 2 lab technicians to perform sampling. This involves holding the bags, sampling the media and returning the bag to the holding bin.

Task: Develop a solution to improve the long-term efficiency and reduce the number of lab technicians by assisting them in the bag handling process.

Driving Question
“How can we make handling bags more effective and efficient than the previous method without causing cross contamination?”

Indices of Performance

Time:
- Needs to be equal to or less than the amount of time it would take two people. Currently takes on average 51.26 seconds for 5 bags.
- Goal (One Technician): Take less than or equal to half of duration for two-person team. This would double the samples that can be taken in the original 51.26s with just one lab tech.

Material Strength:
- Can hold up to 6 kg of force (Factor of Safety FS 1.5)
- Bleach resistant and easy to clean (does not corrode or lose structural integrity).

Design Process

Time studies to validate and ensure lab technician buy in
Team brainstorming, designing, and prototyping

Discuss and feedback surveys with lab technicians and project sponsor

Improve long-term efficiency

Reduce time needed for testing
Reduce number of lab techs needed to 1
Make process similar with all bag sizes

Issues & Assumptions

Issues
- Health and Safety
  - Sterile lab environment
  - Cross contamination

- Material Cost and Manufacturability
  - Easy and cost-effective to manufacture

Assumptions
Lab technicians running time studies will be roughly equal in experience and consistency

Risks

Performance
- If product doesn’t meet requirements, lab team will use original method

- Bacteria contaminations and hazards

- Inability to produce product cost-effectively

- Inability to meet specified deadlines

Materials

- Health & Safety
  - Sterile lab environment

- Cost

- Schedule

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Results

Final Deliverable: V-Stand Prototype
The final prototype featured an ambidextrous handle and ratcheting clamp, which functions to open and close the internal V. The internal V sits in the opening of the V-stand and is the mechanism that squeezes the sampling bags. The internal V is also modular, connected by magnets allowing it to function as a clevis.

Final Impact
- V-Stand functions with a single lab technician
- V-Stand supports media filled bags to rest upright without spilling
- Ratcheting clamp brings media to an easier sampling level for smaller bags

Future Recommendations
Due to time constraints our team ran into issues with the ratchet system and safeguarding spillage when sampling. The lab technicians must still hold the bag with one hand while the ratchet is closed in order to prevent spillage when the media level rises above the stand backing.

- Add hanging clips to V-Stand
  - Ensures that bags will not fall over when squeezed
  - Reduces chances of cross contamination and spillage
- Make prototype out of one material; aluminum or stainless steel.

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