

About 'Industrial Dust Collection System' Project

What:

Designed a device that could collect dust in the air while releasing clean air, for use in the industry.

Why:

During my internship at World of Stones, I visited the grinding and polishing department and realized that although the department was in an open shed and everyone was wearing masks, the workers were still exposed to a lot of marble dust in the short range. Finding the health risks of this exposure (eg. diseases like silicosis) through research outside the internship, I decided to address this challenge to improve the workers' conditions.

How:

Using circular motion principles learnt in the Physics classroom, research techniques like Design of Experiment and ANOVA Analysis, skills like 3D modelling and 3D printing, and concepts learnt about cyclone separators through research, I was able to design an industry-tested dust collection device to work in the short range at high efficiency.

What skills I learnt/developed:

Problem solving- When using simple concepts about physics learnt in school in combination with knowledge gained about cyclone separators through research to real-life applications for the benefit of the worker community.

Creativity- When brainstorming potential solutions to create a device effective to work in the short range, like cyclone separators.

Critical thinking- When designing the Design of Experiment L27 matrix to determine the elements I would vary in the prototype, and when critiquing the results from different perspectives to identify places where I could improve the design (eg. changing dimensions of the area to attach more firmly with the grinder without disrupting the worker operations).

Communication- When writing a clear, concise, and professional report to be submitted and accepted by the ICFAMEAD-2024 conference and to be published in the Engineered Science Publisher journal.

Interdisciplinary nature of my field- I realized how mechanical engineering brought together various other fields of study like electrical engineering, entrepreneurship, when I was programming an Arduino to run the device, but also when I will advertise this product to machine-manufacturing and stone-processing factories.

New skills and techniques directly relevant to engineering and other, similar projects I aim to do in the future at university and beyond!

What I plan to do next:

Convert the prototype into a usable product with more rigorous testing, sturdier materials for use.

Make the product usable for different grinders, not restricting dimensions to just the operations of a specific type of the machine.

Pitch the product to companies like Shree Bhagwati Machines Pvt. Ltd, who have significant market reach and could sell the product along with the grinding machinery they supply factories with.

