INDUSTRY SAFETY EVALUATION

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ABSTRACT

The project's objective is to conduct research and design on FRP (fiber reinforced plastic) dust, conduct a risk assessment, design tools, and make recommendations for reducing or eliminating FRP's impact on industries. FRPs produce abrasive and electrically conductive dust that has the potential to also cause explosive dust-air mixtures in the machine tool's enclosed workspace. Powerful extraction systems (engine power greater than 5 kW) are typically installed and operated at a constant flow rate in order to safeguard both the machine tool and the machine operator. This significantly raises the machine tool's overall energy consumption. In order to improve the energy efficiency of dust extraction systems, a novel method for demand-oriented flow rate control is presented in this paper. This project's objective is to regulate the industries' FRP flow rate. The evaluation of human-related potential threats is the focus of this project. The risky management of the FRP dust is another aspect of this project. For each and every one of the hazards that were found during the hazard assessment, recommendations must be made to control or eliminate it. The specific steps needed to fix the issue should be included in the recommendations.

Keyword: - *FRP, MACHINE TOOL, DUST EXTRATION, DESIGN TOOL and ABRASIVE DUST*

1. INTRODUCTION

In the wind blade, aerospace, and numerous auto mobile industries, fiber-reinforced plastics (FRPs) are gaining popularity. They are portrayed by their heterogeneous and anisotropic material properties, and have customizable strength or oxidation opposition abilities. Fabricating ventures are confronting difficulties, for example, decreased item improvement, abbreviated item life cycles, and an interest for customization. Haddad did a thorough investigation into the formation of dust during CFRP milling, and the main challenge in modeling and analysis right now is being able to compare and analyze products in order to define new product families.

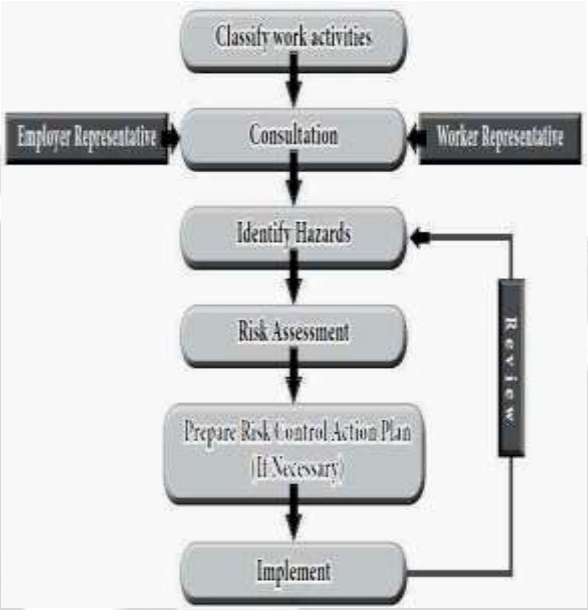
Dust extraction systems are necessary to safeguard both machines and human resources. The only independent wind blade manufacturer with a global presence is Tpi Composites, a leading manufacturer of wind blades. We are settled in Scottsdale, Arizona and have extended our worldwide impression to incorporate homegrown and global offices. In order to efficiently and economically serve the expanding global wind market, our advanced manufacturing facilities are strategically situated. Our wind blades aid in reducing greenhouse gas emissions, supporting the decarbonization of energy production, and assisting in the fight against climate change. With cutting-edge engineering centers and manufacturing facilities covering more than 6 million square feet and 14,000 employees, TPI has established a global presence.

2. FRP DUST AND MAN KIND

FRP is lighter than steel and has a higher hardness. It is utilized to fabricate speedboats, rafts, yachts, and vehicle producing enterprises. Cutting, on the other hand, generates a significant amount of FRP dust, which pollutes the workplace. Styrene, which is extremely harmful to the human body and has the potential to cause silicosis and the death of macrophages, makes up the majority of FRP dust. As a result, it's critical to pay as much attention as possible to the dust.

When working with products and materials made of fiberglass-reinforced plastic, this article discusses potential health risks. It suggests that readers investigate the research methodology, the expertise of the researchers, and the funding sources for such work. High levels of dust, particularly fine particles, would irritate the respiratory system. It is recommended to spend time and money on a thorough cleaning of the house if a fiberglass-reinforced plastic panel was cut inside and caused a lot of dust. Due to their isolation, isolated building areas are less likely to have high levels of cutting dust. dust removal through HEPA vacuuming and damp wiping.

3. HAZARD & Risk ASSESSMENT



RISK = PROBILITY x FREQUENCY x SEVERITY

ProbabilityValue	Probability -chance anincident will occur
10	Expected
6	Highly possible
3	Possible
1	Possible but low
0.5	Unexpected but possible
0.2	Not expected

Table 1- probability

FrequencyValue	Frequency indicates the duration that arisk can occur

10	Continuous (multiple times a day)
6	Frequently (daily or several times)
3	Occasionally (weekly or several times)
2	Sometimes (Once a month or several times)
1	Rare (infrequent times)
0.5	Very rare (once a year or less common)

Table 2 – Duration of the risk occurrence

SeverityValue	Severity - the possible damage, effects andconsequences linked to a hazard.
100	Multiple fatal accidents/disaster
40	Fatal accident
15	Permanent damage/injury
7	Significant damage/injury, external first aid needfor help
3	Minor damage/injury, internal first aid
1	slight effect - injury without absence through illness

Table 3 – Consequences of the risk

Risk Value	Risk Assessment Results
R > 401	**Intolerable Risk**: Risk is too high; necessary action to be taken immediately/or facilities,buildings, environment shutdown should be considered
201<R<400	**Based Risk:** short term improvement (within a few months)
	Significant Risk: Should be improved in the

71<R<200	long run(during the year)
21<R<70	**Possible Risk:** Should be applied under supervision
R<20	**Insignificant Risk:** Acceptable/Precaution is not priority

Table 4 – Risk assessment result

4.PROBLEM RECTIFICATION

4.1 RECTIFICATION IN THE SUCTION LINE

Problems in composites companies can result from contamination, internal corrosion, mechanical failure, damage to the suction line, and a suction line with a smaller diameter. The implementation of the recommended line with reducer (150/100 mm, 100/60 mm DIAMETER) results in an increase in dust collection efficiency.

4.2 RECTIFICATION IN THE TOOLS

In process plants, vacuum pumps and systems are frequently utilized equipment. In order to establish the appropriate specifications, it is essential to select and size the vacuum pump appropriately. A vacuum system's proper operation depends on process parameters like suction load, temperature, leakage rate, and suction gas composition. Guidelines for troubleshooting are discussed to address typical issues. The Dynabird machine and a modified Sen vac suction guard increase suction.

4.3 PROPER UTILIZATION OF DUST HOOD

A significant factor in improper dust collection is improper use of the suction hose and machine. To lessen the likelihood of an explosion, a deflagration system is required. To prevent self-ignition and clinging to the media, the dust collector ought to be outfitted with an internal fire suppression system and a static-reducing filter media. Filter life is extended by combining a pulsing system with media that reduces static.

5. CONCLUSIONS

The current project's work was done to check and fix the dust collection mitigation process as well as safety, health, and the environment.This project's correction dealt with three crucial aspects:

- Retraction along the suction line. Retraction in the Tool.
- making good use of the dust hood.

In view of perceptions of dealing with, I found that my working environment's well being society and amazing preparation help laborers in their work. The worker's training improved the safety culture at the site and helped them learn and understand safe procedures. All necessary standards were adhered to in order to reduce the likelihood of injuries occurring during activities. Safety and equipment maintenance are intertwined. Regular upkeep improves both health and safety in the workplace.

6. REFERENCES

[1] Adams, R.D., et al., 2014, "Recycling of Reinforced Plastics," Applied Composite Materials, 1-22. DOI 10.1007/s10443-013-9380-1.

[2] Alam, S.M., E. Slater, E., and Billah, A.M., 2013, "Green Concrete Made with RCA and FRP Scrap Aggregate: Fresh and Hardened Properties," Journal of Materials in Civil Engineering, 25(12), 1783-1794.

[3] Asokan, P., Osmani, M., and Price, A.D.F., 2009, "Assessing the recycling potential of glass fibre reinforced plastic waste in concrete and cement composites," Journal of Cleaner Production, 17(9): p. 821-829.

[4] Asokan, P., Osmani, M., and Price, A.D.F., 2010, "Improvement of the mechanical properties of glass fiber reinforced plastic waste powder filled concrete," Construction and Building Materials, 24(4), 448- 460.

[5] ASTM C289, 2007, Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method), ASTM International, West Conshohocken, PA, USA.

[6] AVK, 2013, Composites Market Report 2013, Industry ever einigung Verstärkte Kunststoffe e.V. (Federation of Reinforced Plastics), www.avk-tv.de Boesch, M. Elias and Hellweg, S., 2010, "Identifying Improvement Potentials in Cement Production with Life Cycle Assessment," Environmental Science & Technology, 44, 9143-9149.

[7] Current State of Recycling Sheet Molding Compounds and Related," Journal of Thermoplastic Composite Materials, 18, 219-240. EuCIA, 2011, "Glass fiber reinforced thermosets: recyclable and compliant with the EU legislation," European Composites Industry Association (EuCIA), www.eucia.org Goodship, V. (ed), 2009, Management, Recycling and Reuse of Waste Composites, Woodhead, UK. Grause, G., et al., 2013, "Recovery of glass fibers from glass fiber reinforced plastics by pyrolysis," Journal of Material Cycles and Waste Management, 15(2), 122-128.