

Employment of Zero Emission Strategy in Edible Oil Producing Industry as a Green Manufacturing Technique

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ABSTRACT

The paper gives the survey of green manufacturing, what is green manufacturing why it is needed and methods of green manufacturing that reduces the waste and even pollution. The paper also highlights the use of green manufacturing to form a sustainable product and to reuse the product, shorter life cycle. The main objective of the green manufacturing is to save the environment and to reduce the cost of the product. The paper also describes, the various processes carried in an oil industry right from the raw material processed up to the desired output and the initialization of zero emission strategy to make the process a green manufacturing technique. The paper focuses on the green design for environment of green manufacturing system, energy conservation, development of product with less wastage.

Keyword : - Green Manufacturing, Green Accounting, Supply Chain, Environment.

1. INTRODUCTION

Method for manufacturing that minimizes waste and pollution achieved through product and process design can be termed as green manufacturing. It can also be said as philosophy rather than an adopted process or standard. Green Manufacturing is generically defined as 'elimination of waste by re-defining the existing production process or system'. Several other jargons such as 'end-of-line management' mean the same thing. We have all come across company examples that take their problem solving approach to the next level and develop innovative techniques towards effective solutions. Such solutions result in cost savings from reduced work handling, effluent control, process automation, etc. All these efforts are applications of green manufacturing.

The Green Manufacturing concept is not just restricted to addressing the social and environmental impact of a pollution-centric process. Green manufacturing addresses process redundancy, ergonomics and cost implications due to fault methods of producing goods. Faster and cheaper are no longer the only two criteria in manufacturing a product or evaluating an existing process line. Several other factors such as materials used in manufacture, generation of waste, effluents and their treatment (or possible elimination), life of the product and finally, treatment of the product after its useful life are all important considerations.

2. NEED OF GREEN MANUFACTURING

Without a fundamental rethinking of the structure and the reward system of commerce, narrowly focused eco-efficiency could be a disaster for the environment by overwhelming resource savings with even larger growth in production of the wrong materials, in the wrong place, at the wrong scale, and delivered using the wrong business models. The needs for the Green Manufacturing are as follows;

- a. To create and enrich a sustainable environment in all terms for the future generations.
- b. To reduce the non-consumable heaps of scraps and non-renewable resources.
- c. Substitution for the natural resources to reduce their depletion.
- d. To create ;
 - 1) Social Sustainability.
 - 2) Environmental Sustainability.

3. ZERO EMISSION STRATEGY

The Zero Emission aims to approach the ideal of zero environmental stress by suppressing resource consumption and minimizing waste. The concept of zero emissions is based on improving technologies and processes to the point of maximum resource productivity and virtually no waste. This goal can be approached in a number of ways, including technological innovation, pollution prevention, cleaner production, by-product synergy, or industrial ecology. All of these are ways of eliminating wastes or turning wastes into profitable resources, while preventing harm to environmental and human health. The concept of zero emissions has been developed into a methodology that can be applied to any industry sector.

The ZERO methodology can be given by the following points:

- Total Throughout :-A review of the industry identifies opportunities to minimize inputs and maximize outputs. The aim is to make full use of all the inputs; i.e. total throughput. If this cannot be achieved, the next step of the methodology is applied.
- Output-input Models :- An inventory is created of all 'wastes' - i.e. outputs not consumed in the final product or in its process of manufacture. An active search is then initiated to identify industries which could use these outputs, or modified versions of them, as inputs.
- Industrial Clusters :-The output-input models are used to determine potential candidates for industry 'clustering'. The next step is to identify optimal clusters in terms of size and number of participants.
- Breakthrough Technologies :- In cases where current engineering expertise and process technologies are not able to secure effective and economical coupling of outputs and inputs, research into 'breakthrough technologies' or system designs is initiated.

4. PROJECT ANALYSIS

Rama Phosphates, Indore is a leading producer of edible soya oil and soya cakes and took the first undertaking in implementation of green manufacturing and technology after the approval of certifications ISO 9000 and ISO 14000. This certifications are the basic need for any green technology to be incorporated in any industry. The existence of this green manufacturing came into the RAMA PHOSPHATES from 2011. The raw soya beans after the cleaning process is allowed to turn into edible oil and the remaining residue which is fit for making of soya cakes is separated. The remaining output

in terms of materialistic residue is digested and is made to undergo anaerobic process. The digestion process involves microorganisms breaking down the food waste in reactors in the absence of oxygen, thus producing methane or biogas that can be burned to generate energy. The digested food waste can be used as compost for planting.

After all the process the compost is allowed to be used in the manufacturing of low quality of Cartons which can be assisted for packing purposes. Hence zero emission of waste and improvement in the company's output annually.

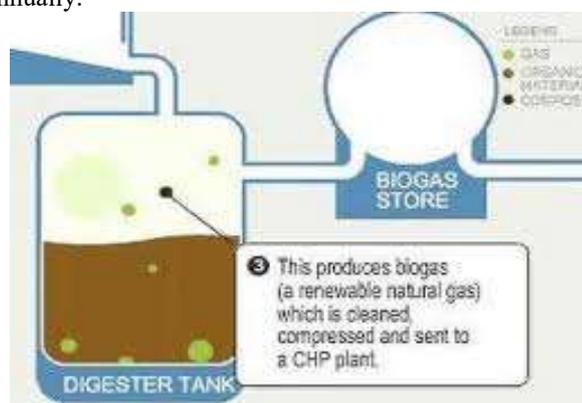


Fig 1 Biogas Generation Setup

5. ADVANTAGES

- The reduction in production cost is the most important advantage.
- Go-Green Goals can be achieved by material reuse as natural resource use is eliminated.
- The pollution rate is however reduced upto a great extent by 60% annually.
- Economy in turn increases by the green terms.
- Promotes 'Clean INDIA Mission' headed by Honourable PM. Modiji.

6. DISADVANTAGES

- Initial investment is however a bit more than standard processing units (not more than 5%).
- International businessmen import and export trades of raw materials however face a huge loss in terms of money.

7. AREAS OF APPLICATIONS OF GREEN MANUFACTURING

- Lean manufacturing attention paid to waste generated along the way energy reduction in streamlined logistics.
- Materials reuse, recycling.
- Green plastics (biodegradable).
- Product design use of recycled materials, design for service, disassembly and recycling.
- Green chemistry avoidance of toxics harmless solvents technologies.
- Semiconductor, electronics more benign manufacturing processes.
- Automobile design and manufacture.

8. FUTURE ENHANCEMENTS

The future scope of green manufacturing employing zero emission strategy as a development tool for improving efficiency can be made available in every industry incorporating new green technologies. Symbiotic energy generation is possible by enriching the quality of production in industrial sectors which directly or indirectly influences the future world.

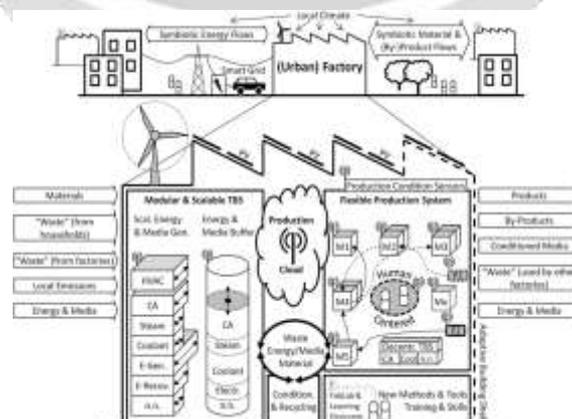


Fig. 2 Overall Future Enhancements

9. CONCLUSION

Green manufacturing is not an option, but a necessity for our well-being and survival. Our needs are likely to increase as standard of living and population increases. Accordingly we will have to change our current practices. For that green manufacturing can be highly used as a precise tool for improving the life cycle of the environment and ultimately the efficiency and economy of a country as a whole.

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