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GREEN MANUFACTURING TECHNOLOGY- SOLUTION FOR ENVIRONMENTAL IMPACT AND WASTE

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ABSTRACT- ***In the present competitive World, most probably manufacturing companies are in the race of earning maximum profit (money) on the cost of damaging and polluting the environment. In this paper, identify the factor, which is used to implement green manufacturing in the industry. This paper mainly focuses on the component of the green manufacturing design without harming nature. The aim of this paper is to the attention of the manufacturer who is manufacturing the product with the mass production towards green manufacturing. The different types of gas emission and the waste that is generated from the industries is one of the main factors for the environmental degradation which leads to water pollution, global warming (GW), air pollution and acid rain. The waste is being produced by different manufacturing industries can be minimized by the implementation of the green manufacturing techniques. The present paper deals with the solution for environment impact and reduce waste from the industries by applying green manufacturing techniques.***

Keywords: Green Manufacturing, waste generation, 4R Principle, Pollution

1. INTRODUCTION:

Green Manufacturing (GM) is a manufacturing process, which used input data with relatively low environmental impacts and creates little waste or pollution and greenhouse effect (GHE). GM techniques are used to make the system more eco-friendly and eco-efficient with the use of green strategies. The goals of GM are to utilize minimum natural resources and conserve them for future generations. Green manufacturing is used to saves useless cost and promotes research and redesign. GM is the only solution for sustainable development and it is also the responsibility for the society of an enterprise. Green manufacturing emphasis the manufacturing process that does not pollute the environment or harm consumes employees or other members of the community. The term " green" manufacturing can be understood in two ways: the manufacturing of green products and all kinds of clean technology equipment and the "greening" of manufacturing reducing pollution (air pollution, water pollution etc.) and waste by minimizing natural resource use, recycling and reusing waste and reducing gas emission.

GM increased production efficiency, which can be obtained by reducing waste and improving the organization of the manufacturing system. Green manufacturing and waste shown in the figure 1.

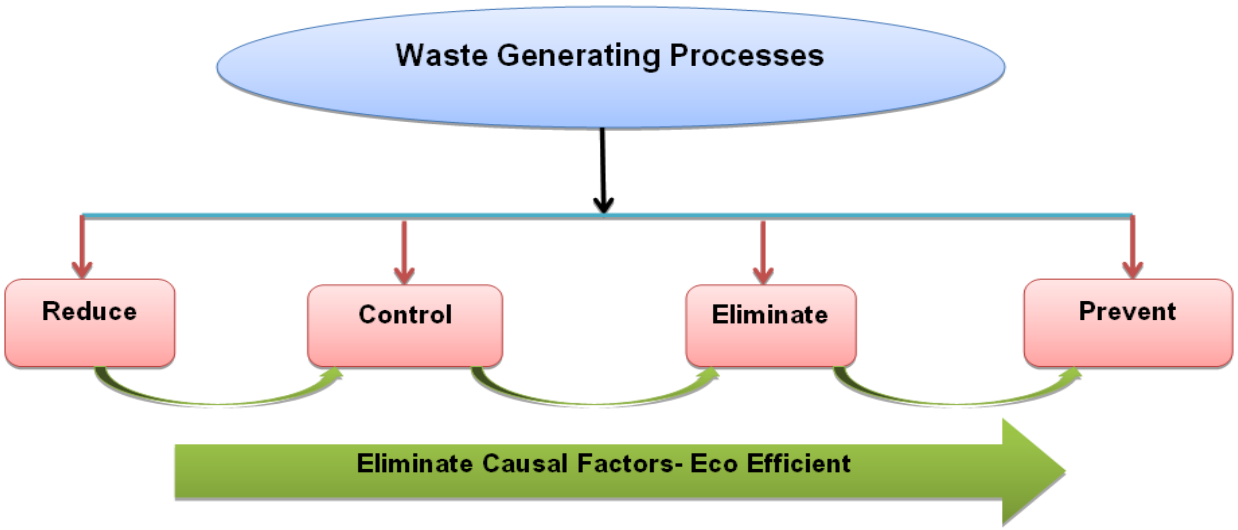


Figure1: Green Manufacturing and wastes

Sustainable development is necessary to prevent unnecessary and environmental degradation. By the use of sustainability in green manufacturing, control and reduction in material waste in manufacturing cycles, preserve capital and save money and easy to adopting the capability of changing rules in environmental.

2. LITREATURE REVIEW:

At the present time, the role of green operation is being widely used in green manufacturing processes leading environmental consequence that the considered essential for business operation with the aim to reduce costs and develop quality products. Green operation is used to product development to manage of the entire product life cycle involving such environmental practices such as eco-friendly design, clean production, and reuse and recycling with a focus on minimizing the expenses associated with manufacturing. Green manufacturing must be the central concern of the facility's top management. This is usually helped by outside pressure from government or environmentalism or by the convincing demonstration of its benefits. GM is very helpful for worker which involve in the production. There are 4R principle is used to reduce environmental impact developed due to the manufacturing firm. Reduce is used to decrease consumption of resources like energies as well as emission of wastages, which help to reduce environment burden and less harm to people's health. Reuse is related to the reusing the products or components. Recycle is used to require the products to be able to transform into reusable resources instead of rubbish that cannot be used any longer. Remanufacturing is an approach used to recover the dragged products back to the ones close to new products after a series of processes like as dismantle, cleaning, examination, renewal, repair, and equipment. Reproduce is utilized to recover the scraped products back to the ones close to mew products after a series of processes such as dismantle, cleaning, examination, renewal, repair, and equipment. 4R principle for green manufacturing shown in the figure 2.

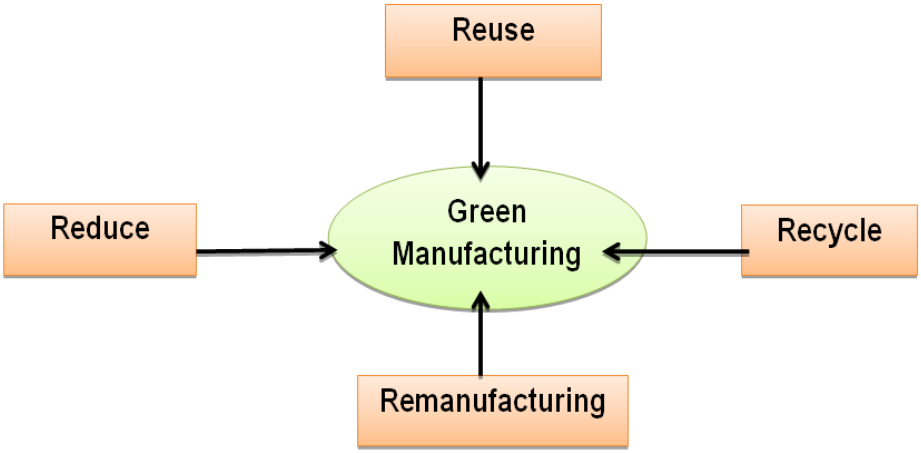


Figure 2: 4R Principle for GM

There are five core technology used in 4R principle shown in figure 3.

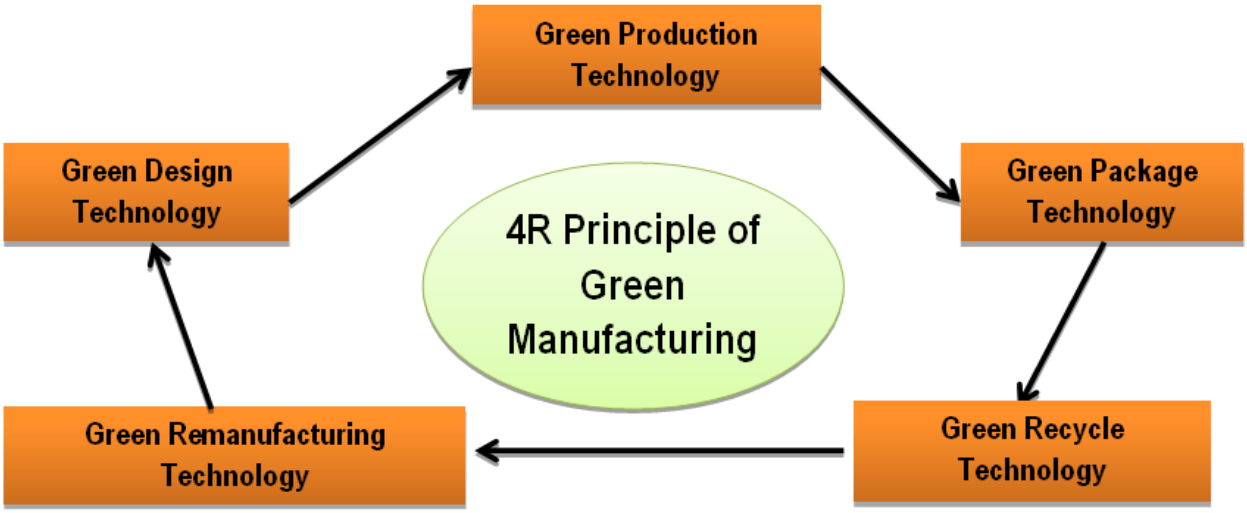


Figure 3: Five core techniques in 4R Principle

2.1 Major Green Manufacturing options:

There are five major areas of GM option such as product changes, production process changes, changes of input in the production process, internally re-use of wastes and better housekeeping.

1. **Factor changes production process:**
   Many major production processes changing fall in to this category.
- Changing dependence on human intervention.
- Use of continuous process instead of the batch process.
- Changing the nature of the steps used in the production process.
- Changing in the cleaning process strategies.

Production dependent on human activity in the production process leads to different kinds of problem, ranging from off-specification products to major accidents.

2. **Factor changes of inputs in the production process:**
   Changes in the inputs play important role in the green manufacturing system. Both type of major and minor ingredients in products and contribute to production without being incorporated in the end product may be worth changing. Substituting water-based for solvent-based coating may lesser environment impacts when the use of paints in the production of cars and airplanes.
3. **Internally re-use:**
   The internally re-use is often substantial with many possibilities for the re-use water, energy and some metals and chemicals. In some production processes, cascade type re-use system is used. In cascade type re-use water used in one process step then used in another process step where quality requirements are stringent.
4. **Better housekeeping:**
   Better housekeeping refers to generally simple, non-resource intensive that keeps a facility in good working and environmental order. The maintaining operating conditions such as flow rate, temperature, pressure are necessary to obtained better housekeeping.

3. CONCLUSIONS:

The aim of this paper is known about the green manufacturing and their components which help to reduction in waste as well as reduce environmental impact by the use of 4R principle in manufacturing. Current situation of the manufacturing firm to stable in the competitive market developed new manufacturing system such as green manufacturing, which is not, affected the environment as well as society on the earth and for improving in production efficiency by waste reduction, re-use, recycle and remanufacturing. Green manufacturing holds potential to meet both manufacturing and environmental challenges.

4. FUTURE SCOPE:

In the future, Green Manufacturing Technologies uses zero emission strategy as a development tool for every industry incorporating new green technologies. So green manufacturing is helps to reduction in environment impact as well as reduction in waste material produce by the industries. In future, green manufacturing play important role to the industry as well as environment impact.

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