Concept Note on
National Productivity Week Theme:
"From Waste to Profits through Reduce, Recycle, Reuse"

Productivity is above all a state of mind-set. It is an attitude that seeks the continuous improvement what exists. Productivity should not be viewed merely as a narrow technical concept. It is also a social concept. It is based on the belief that one can do things better today than yesterday and better tomorrow than today. Productivity, in a broad sense, is a measure of how efficiently and effectively resources are used as inputs to produce products and services needed by society. Productivity improvement means improvement in QCDMS:
Q=Quality (Higher quality that meets or exceeds customer requirements.
C=Cost (Lower Cost)
D=Delivery (Timely delivery as desired by the customer)
M=Morale (Boosting morale of all concerned)
S=Safety (Improving the safety of every aspect of the product and process)

One of the causes for the increased importance of productivity has been market-driven competition. The fiercer competition becomes, the more companies believe their survival is threatened. Under these circumstances the importance of productivity has increased to a point where input and output alike top the agenda. National Productivity Council (NPC) has been a catalyst to bring productivity culture within the organization and across the country through emphasis on a selected theme every year. This year, NPC has selected the theme as "**From Waste to Profits through Reduce, Recycle, Reuse".**

Outputs are divided into two groups: desired outputs and undesired outputs. Undesired outputs are often called "waste". The primary aim of productivity improvement is to increase the ratio of desired outputs to total outputs. The most important input factors are land, labor, capital, materials, energy and environmental protection costs.

Waste is enormously wasteful. It leads not only to pollution today, but to material shortages tomorrow. The age old saying 'waste not, want not' is as valid in the 'affluent society' of today as it is ever was. The very existence of society as we now know it is threatened by the continuing waste of precious, scarce resources. If the present industrialized society is to survive, it must become a non-waste society with a non-waste economy using non-waste technology and above all a non waste value system.

As we know natural resources are limited and finite, even though new sources may be discovered as man explores farther and deeper. But the use of the available resources should be planned to ensure their effective deployment and to prevent waste. Therefore, waste minimization is a process of elimination that involves reducing the amount of waste produced in society and helps to eliminate the generation of harmful and persistent wastes, supporting the efforts to promote a more sustainable society. In a developing country like India, Waste Minimisation is the need of the hour. Besides reduction in pollution load, it has in-built benefits to the industry such as cost reduction, quality improvement and even improvement of

the image of the company. Although waste minimisation has explicit benefits, the concept has not really picked up in our country due to the absence of a coherent and close working group to facilitate enhancement of information and also to provide guidance to the needy. In the absence of such a group the success achieved by an individual unit remains confined to the unit itself without having any multiplier effect.

More waste is generated in cities and towns than in rural areas. Recent studies show that higher the rate of economic development and urbanization, the greater the volume of waste produced. With natural resources declining in both quantity and quality, the time has come to practice resource recovery. Materials, water, and energy that are regarded as unproductive by one company can be turned into a business opportunity by another operating nearby. Reducing consumption of energy and materials through technological innovation, design changes, and better housekeeping and maintenance, improves the quality of the products, reduces the level of pollutants and effluents discharged into the environment and reduces costs as well. Hence, waste minimization is a new and creative way of thinking about products and processes that make them.

In industries, using more efficient manufacturing processes and better materials will generally reduce the production of waste. The application of waste minimisation techniques has led to the development of innovative and commercially successful replacement products. Waste minimisation has proven benefits to industry and the wider environment. It helps in value creation and improves quality of work. Waste reduction and waste auditing is critical to the prevention of future hazardous waste problems. By reducing the generation of waste, materials can be used more efficiently and achieve more certain protection for health and the environment. At the same time, industry can lower management and regulatory compliance costs, liabilities and risks. Waste minimisation often requires investment, which is usually compensated by the savings. Further, to minimise the wastage, several steps like resource optimization, reuse of scrap material, improved quality control and process monitoring should be taken.

Waste Minimization helps in optimizing production processes and meeting the increasing quality demands (especially for export markets), at the lowest possible cost. Apart from improving the process efficiency and subsequently reducing the cost of production, it brings down the pollution load. Waste Minimization, therefore, serves the dual purpose of making industrial operations more competitive as well as protecting the environment. It offers the following additional benefits, apart from reducing the requirement of resources viz. raw material, water and energy.

1. Reduction in consumption of resources viz., Raw material, water and energy.
2. Extending product life cycle.
3. Improvement in work environment.
4. Environment cost reduced due to decrease in pollution load.
5. Improvement in quality of processed products.
6. Improvement in overall image of the company.

7. Opening of new opportunities for marketing green products.

To realize the full benefits of waste minimization, one has to take care of the following three important issues:

1. Strong commitment of the management.
2. Active involvement of the operator.
3. An organized approach in assigning responsibility, fixing targets, reviewing progress and timely implementation to achieve long term sustainable benefits.

Simultaneously, the wastes need to be treated and disposed in a scientific manner abiding the applicable environmental legislation. This task is achieved by setting of waste treatment and disposal facilities, either on-site or off-site. Waste treatment facilities also do not have a 100% conversion efficiency and residues can be minimized once again by following some of the Green Productivity (GP) techniques. The waste management/treatment typically includes:

1. Air emission control for:
   a. Stack emissions
   b. Fumes odors at the workspace
2. Effluent treatment plant for:
   a. Industrial effluents
   b. Domestic/sanitary wastewater (cooling water)
3. Solid waste management for:
   a. Industrial solid wastes (hazardous and non-hazardous)
   b. Effluent treatment plant solid/sludge residues

These productivity gains are possible through improved product/service design, manufacturing processes and procedures; increased capital investment in more efficient technology; improved labor performance; increased levels of labor participation; and more effective research and development. It measures one's ability to efficiently utilize available resources to produce desired output and, thus, reflects the changes in productivity.

Green Productivity is one such way of utilizing the waste materials with a multi-dimensional, holistic strategy that aims at improving overall quality of life while leading development in a sustainable direction. In Green Productivity practices, the main objective is to identify ways to prevent pollution or waste at its source (increasing output and improving quality), as well as reduce the level of resource inputs through rationalization and optimization (decreasing input). GP practices and techniques do not require a new set of skills to be learned; rather, it is the application of productivity and management tools to a new set of priority.

The concept of green productivity is drawn from the integration of two important developmental strategies:

- Productivity improvement and
- Environmental protection

Productivity provides the framework for continuous improvement.

Environmental Protection provides the foundation for sustainable development

However, going forward, there is also a need for continuous application of strategies to minimize the generation of wastes and emissions. **Reduce**, **Recycle, Reuse through Recovery** is one such strategy**.** The 3Rs provide the basic framework for integration of environmental and productivity activities. They demonstrate that caring for the environment is a wise business decision.

1. **Reduce**: means limiting the number of purchases that you make in the first place.
2. **Recycle**: means returning a waste stream to the system either to be used for the same type of product as it was originally manufactured, or to be remanufactured into something new.
3. **Reuse through Recovery**: means returning a waste stream or product to be used for the same purpose repeatedly and recovering something from the waste stream of a process and inputting it into the same, or another process so that it can be used as raw material or energy source for another process.

The 3Rs are useful from both an environmental and productivity improvement perspective. They can help when waste management programs have to be implemented or when increased efficiency is sought in business processes. This will not only lead to improved productivity and environmental indices, it will also aid in creating a better working environment.

Thus, the industrial units can draw the following benefits by applying the concepts of Waste Reduction through 3Rs:

1. **Improvement in Work Environment:** Waste Minimization helps you to improve the shop floor environment leading to higher efficiency and better working relations.
    a. Plant appearance is better.
    b. Workers health problems are reduced.
    c. Spillages are reduced.
2. **Quality Improvement:** Waste Minimization leads to improvement in quality of processed products like reduction in rejection rate, produce superior quality etc.
3. **New Market Opportunities:** Increasing consumer awareness of environmental issues, has led to a high demand level in international markets. Consequently, if you put in conscious efforts towards Waste Minimization you open up new market opportunities.
    a. It opens the opportunity for marketing green products.
    b. Due to better quality of products produced by implementing Waste Minimization, products are saleable at a higher price
4. **Environmental Cost Reduction:** The effluent streams in the unit become smaller and less contaminated and can be treated in simpler and low-cost treatment plants.
    a. Reduced energy consumption in treating waste
    b. Amount of chemicals required for treating waste are reduced.
    c. Reduced manpower and equipment requirements for onsite pollution control and treatment.
    d. Area required for waste treatment and disposal is reduced.

e. Waste disposal cost is reduced.

Therefore, it is appealed to all the industrial units in the country to incorporate tools and techniques related to waste minimization. However, it is perceived for the industry that if the generator of the waste cannot recycle his waste himself, he needs to look for a buyer to take it from him which can be understood by a method called waste exchange that is using of waste from one industry that is valuable to another thereby facilitating recycling with the substantial contribution towards minimizing the volumes of waste that have to be disposed of.

To sum up, there exist some valuable lessons which we learn so as to minimize wastage in an efficient manner:

a. Be prepared for the worst: it can happen anytime, anywhere
b. Reduce demand by conservation, substitution and new technology.
c. Increase supply by exploration, investment and new technology.
d. Evolve and implement a proper resource management system.

Thus, there is need for a coordinated, comprehensive and holistic strategy, which involves the fullest mobilization of all our economic endeavors resulting in increased yields at optimal use of all input resources reducing wastage of raw materials. Waste minimization is a proactive approach to improving the working environment, resource utilization, and the overall productivity of enterprises. While most large Indian units have taken initiatives for waste minimization, the majority of small and medium units have not. In the steel industry, for example, the integrated steel mills have taken measures to minimize waste due to the cutthroat competition in the international market. Keeping the importance of realizing higher productivity and minimal waste on continual basis for various sectors of economy, “Waste Minimization and Profits from Waste” is selected as the theme for the ‘National Productivity Week-2017’.

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