

Abstract

Cleaner production is the continuous application of an integrated preventive environmental strategy to process, products and services to increase overall efficiency and reduce risks to humans and the environment.

Cleaner production assessment methodology is used to systematically identify and evaluate the cleaner production opportunities and facilitate their implementation in the industry.

Various types of Cleaner Production Options include: Raw material substitution, Process Optimization, New Technology, New Product Design and Housekeeping. There are basically six steps involved in Cleaner Production Methodology: 1) Getting started; 2) Analyzing the process steps; 3) Generating Cleaner Production opportunities; 4) Selecting Cleaner Production solutions; 5) Implementing Cleaner Production solutions and 6) Maintaining the strategy.

There are some important reasons to invest in Cleaner Production: a) Improvements to product and processes; 2) Savings on raw materials and energy, thus reducing production costs; 3) Increased competitiveness through the use of new and improved technologies; 4) Reduced concerns over environmental legislation; 5) Reduced liability associated with the treatment, storage and disposal of hazardous wastes; 6) Improved health, safety and morale of employees; 7) Improved company image; and 8) Reduced costs of end-of-pipe solutions.

Stainless steel rolling industry produces many kinds of hazardous waste like acid pickling, acid fumes, NO_x etc. Small and medium scale industries have to follow the hazardous waste regulations to prevent the pollution generated by them.

In industry, the most common waste treatment facilities are the effluent treatment plants' end of pipe approach. Cleaner production is a powerful tool to understand the relationship between environmental and industrial economy. Cleaner

production is the only solution to sustain and achieve the economy of small and medium scale industries.

Waste gases from heating furnace, spent cleaning agent (kerosene) of rolls, acid fumes from pickling baths, spent pickling solution scale (oxides of iron), noise, solid waste cake from effluent treatment plant are major emissions from the stainless steel rolling mills. It has been realized by applying cleaner production approach that waste represents resources that were not being economically used. This attitude creates revolution in stainless steel rolling sector.

Bright annealing, recovery of acid or regeneration of acid by diffusion dialysis, recovery of acid by crystallization, utilization of solid waste cake as micronutrient for crops, waste heat recovery by heat recuperator are powerful cleaner production options to reduce operating cost and achieve economy, environmental gain and organizational gain.

The solid waste cake, obtained after treatment of spent liquor, can be used as micronutrient for iron and copper deficient soil. Crystallization of H_2SO_4 pickle bath returns clean acid back to the pickling tanks for reuse and produces ferrous sulphate hepta hydrate crystals, which are commonly used in the animal feed stock and waste municipality industries.

A properly operated and maintained at regular based plant can lead to fuel saving. Maintaining furnace pressure, air/fuel ratio, are valuable parameters to save the fuel and increase the overall efficiency of the furnace Bright annealing is one of the best cleaner production options among all the option, which completely eliminate the pickling and effluent treatment plant.

The case study illustrates positive attitude being taken by some of the small and medium scale industries all over the world.

Key Words : Cleaner production, Rolling Mills, Acid Pickling.