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Environmental Impact Assessment in Pulp and Paper Industry

Priya A. K.*

Department of Civil Engineering, KPR Institute of Engineering and Technology, Coimbatore – 641 407, Tamilnadu, India; akpriy@gmail.com

Abstract

As large industrial users of water, the pulp and paper industry has long managed water in the context of a regulatory environment. In other words, all mills in Tamilnadu must use and treat water in accordance with environmental permits. However, the industry is now collectively moving beyond water quality to better understand the quantity and the environmental impacts of water use. Industry participants are committed to better understanding our impacts and we have identified the evaluation of water foot printing tools and water disclosure as a key initiative. While access to water is an issue of global concern it is critical to recognize local, site-specific resources. Here is the overview on water usage in the pulp and paper industry and offer reflections on the driving forces for and barriers to change.

Keywords: Environmental Permits, Impacts, Industry, Pulp and Paper Industry, Tamilnadu

1. Status of Water in Tamilnadu

The Water Resources Organization prepared a State Framework Water Resource Plan of Tamil Nadu. The annual water potential of the State including surface and ground-water is assessed as 46,540 MCM (1643 TMC) while the estimated demand is 54, 395 MCM (1921 TMC) in 2001 which is likely to go up to 57, 725 MCM in 2050. The various sectors are. 1) Domestic use (urban and rural) is projected to go up from 4 per cent to 6 per cent due to increase in population and due to urbanization. The domestic requirement would increase by 55.72 percent. 2) Agriculture use will remain stagnant or may even decrease due to progressive urbanization. 3) The share of industry may not change much, but in absolute terms the increase will be about 27.7 per cent. 4) Provision of 1600 MCM in 2050 would be made for minimum flow in rivers for ecological purpose, which is a new category for water resource planning.

2. Water Use in Paper Industry

Water is used in all major process stages, including raw materials preparation (e.g., pulping and bleaching) and paper machines (e.g., pulp slurry dilution and fabric showers). Water is also used for cooling, materials transport, equipment cleaning, general facilities operations, and to generate steam for use in both thermal and mechanical processes as well as on-site electricity generation. Overall water intake has been reduced annually through various conservation efforts. Our 2013 water usage was 9.9% less than 2009 In addition to freshwater intake; water enters the papermaking process with raw materials. For example, a 20-ton truckload of logs contains roughly 2,400 gallons of water.

3. Source of Waste Water

A range of industries manufacture or use complex organic chemicals. These include pesticides, pharmaceuticals, paints and dyes, petrochemicals, detergents, plastics, paper pollution, etc. Waste waters can be contaminated by feedstock materials, by-products and product material in soluble or particulate form, washing and cleaning agents, solvents and added value products such as plasticizers. Treatment facilities that do not need control of their effluent typically opt for a type of aerobic treatment, i.e. aerated lagoons.

*Author for correspondence

4. Biological Treatments

4.1 Aerobic Treatment

Aerobic microorganisms require oxygen to support their metabolic activity. Oxygen is supplied in the form of air by aeration equipment. There are numerous of aerobic systems available for degradation of oxygen-demanding organic compounds in industrial wastewater; aerated lagoons, activated sludge systems, biofilm processes etc.

4.2 Anaerobic Treatment

Anaerobic treatment is a treatment without presence of oxygen and is more appropriate for treatment of high strength wastewaters. Effluents originated from recycled fibers are often treated anaerobic; apart from that, this technology is not used as widely as the aerobic treatments in the pulp and paper industry (Ochre-Media, 2001). However, the investment in this technology is increasing due to its many advantages in comparison to aerobic treatment; lower sludge production, lower chemical consumption, smaller space requirements and energy production in the form of bio gas. The major problem with implementation of anaerobic treatment for pulp and paper effluents is the potential for hydrogen sulphide formation; since sulphate is widely used as active cooking chemical in many pulp mills. Another important issue with an anaerobic process is its sensitivity to toxic compounds present in the wastewater. The anaerobic digestion process involves biological conversions in a step-wise fashion, of organic material to various end products including methane (CH4) and carbon dioxide (CO2). The process offers several advantages and disadvantages over other treatment method. A well managed anaerobic digestion system has the ability to produce maximum methane production, and will not discharge any gases to the atmosphere. This system will also provide a source of energy with no net increase in atmospheric carbon which contributes to climate change. Energy generated through the anaerobic digestion process can help reduce the demand for fossil fuels.

5. Recycling of Waste Water

5.2 Reducing Water Consumption

The water consumption of a paper or board mill can be reduced by tightening the water system of the mill. This has the advantage that lower levels of suspended solids, suitable ioi paper raw material are discharged to drain. With less fresh water being introduced to the system, the temperature of the white water rises, which makes it easier to remove writer from the paper web, so that energy can be saved. Increased tightening of the white water system, however, causes some problems in paper and board mills, preventing total closure of the water circulation system. The accumulation of salts and organic compounds dissolved from the fiber raw material increases significantly, which causes problems due to microbiological activity, corrosion and growth of slime, which must lie controlled.

6. Reuse of Water

White water from the paper or board machine may be first treated mechanically by flotation, sedimentation or filtration, or a combination of processes. The flotation treatment is suited to the recovery of fine suspended solids. Sedimentation is better suited to white waters that contain large amounts of filler. Filtration is suitable for white waters that contain low levels of solids and filler. Generally, the brown grades of paper are most tolerant of recycled water, followed by newsprint and tissue types. Fine papers (high whiteness) are very sensitive to color and curtain metal ions, particularly with respect to aging and coloring. The colloidal chemistry involving paper sizing and resin applications is sensitive to phosphate and other dispersants and some metal ions.

7. Conclusion

Water and energy utilization and in particularly waste generation are becoming more important concern ever worldwide. A major goal is to decrease damage to environment by waste minimization, reuse and recycle. The most common applied systems are biological treatment, sequential anaerobic and aerobic systems, followed after primary treatment. However, the waste water minimization has still the first and important approach. The best available treatment technology for all three waste phases depends on the production processes, raw materials and the regulations, which the industries have to obey.

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3. Recycle and Reuse of Domestic Wastewater S. Vigneswaran, Faculty of Engineering, University of Technology, Sydney, Australia M. Sundara Vadivel, Graduate School of the Environment, Macquarie University, Sydney, Australia