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“CLEANER PRODUCTION INITIATIVES AND CHALLENGES FOR A SUSTAINABLE WORLD”

Waste Water Minimization of Starch Industry Using Water Pinch Technology

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Abstract

Water is a vital component for many industrial operations, and is utilized for a wide range of purposes in industrial processes. The rapid growth in population, coupled with industrialization and urbanization, resulted in an increased demand for water, leading to serious consequences on the environment. The cost and scarcity of water beside stricter regulations on industrial effluents have become a significant factor in commodity material manufacturing. In this paper sincere efforts had been put to demonstrate the potential of water pinch technology at real world of industries. To explore the effectiveness of this technology a case studies from a Starch industry of India is under taken with an aim to reduce demineralised (DM) water flow rate and subsequently waste water flow rate. The problem is viewed as a single contaminant problem and all the three modes of water integration i.e. *re-use*, *regeneration-reuse*, *regeneration –recycle* are demonstrated. The DM water consumption is 50 tph before modification and after modification using water pinch it reduces to 31.9 tph (*reuse*), 21.6 tph (*regeneration-reuse*) and 12 tph (*regeneration-recycling*). The results obtained from the present analysis are compared well with the results obtained from well established software ASPEN WATER which uses mathematical programming approach based on MINLP. The cost benefit analysis illustrates that the profit obtained in the case of reuse is 17, 63,914 INR per year and the payback period for the *regeneration-reuse* and *regeneration –recycling* are 1.8 and 1.1 months. A computer program is developed in MATLAB for analysis of the above case study using water pinch technology.

Keywords: Waste water minimization, Water Pinch, Starch

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