



INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

"KEY ELEMENTS FOR A SUSTAINABLE WORLD: ENERGY, WATER AND CLIMATE CHANGE"

WSD as a Sustainable Tool for the CP Practices: Water/Wastewater Minimization in Industrial Processes

R. C. Mirre ^a, L. Yokoyama ^b, F. L. P. Pessoa ^c

*a. Universidade Federal do Rio de Janeiro, Rio de Janeiro,
reinaldomirre@hotmail.com*

b. Universidade Federal do Rio de Janeiro, Rio de Janeiro, lidia@eq.ufrj.br

c. Universidade Federal do Rio de Janeiro, Rio de Janeiro, pessoa@eq.ufrj.br

Abstract

Cleaner Production (CP) practices in the industry require an adequate understanding of the characteristics of the manufacture processes. If the aim is to minimize the water consumption and the environmental impact due to the generation of effluent, then water processing in the industry are very important. In this way, it's necessary to provide environmental sustainable practices, such as reusing water and wastewater. The necessity in developing water reuse programs in several areas, mainly in the industrial sector, has been related to the use of technologies as the tools for an adequate water resources management. Process Integration is a part of the Process Systems Engineering, which has been allowing improvements techniques applied to waste/wastewater minimization. Hence, an important tool is called Water Sources Diagram (WSD), an algorithmic procedure that uses heuristics rules and searches the best connections between sources and sinks of water within the industrial processes. It allows the synthesis of the mass exchange networks with maximum water reuse, including regeneration and recycle processes. The objective of this work is to focus on the WSD algorithmic procedure as a useful tool for evaluation of practical analysis on the water and wastewater minimization, in the Cleaner Production approach. In this work a case study is used to illustrate the application of this procedure showing the reduction of water flow rate obtained compared to the original flowsheet. Besides, the WSD performs calculations quickly, even by hand, and generates process mass exchange network without process modifications simultaneously. The application of the procedure in the industry requires the characterization of water and wastewater with respect to flow rate and contaminants concentrations in the respective streams.

Keywords: Industrial water management; Water/wastewater reuse; Environmental friendly strategies
