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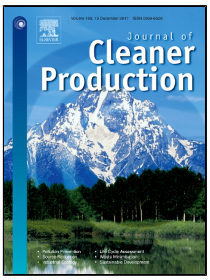

Accounting for the benefits of technology change: replacing a zinc-coating process by a water-based organo-metallic coating process

C.M.V.B. Almeida, F. Sevegnani, F. Agostinho, Liu Gengyuan, Yang Zhifeng, L. Coscieme, B.F. Giannetti

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Accounting for the benefits of technology change: replacing a zinc-coating process by a water-based organo-metallic coating process

Almeida, C.M.V.B.[1], Sevegnani, F. [1], Agostinho, F. [1], Liu, Gengyuan[2,3], Yang, Zhifeng[2,3], Coscieme, L.[1], B.F. Giannetti[1,2]

1 Laboratório de Produção e Meio Ambiente, Programa de Pós-Graduação em Engenharia de Produção,Universidade Paulista, R. Dr. Bacelar 1212, Cep 04026-002, São Paulo, Brazil

2 State Key Joint Laboratory of Environment Simulation and Pollution Control, School of Environment, Beijing Normal University, Beijing 100875, China

3 Beijing Engineering Research Center for Watershed Environmental Restoration & Integrated Ecological Regulation, Beijing 100875, China

Abstract

Technology change is a well-known strategy used by Cleaner Production (CP) practitioners, and it refers to modifications in the process and/or equipment to increase production efficiency and reduce waste and emissions. These changes can range from small, low-cost options to the replacement of processes that involve large capital investments. The improvements and advantages of the new alternatives must be evaluated in a way to measure and assure its real benefits. This work presents an emergy evaluation of a fasteners manufacturing company planning to replace the zinc-coating process by a water-based organo-metallic coating process. Accounting for the use of resources and the environmental services to dilute the Cr (VI) in the effluent, the study shows that the effluent treatment is efficient and that the emergy invested by the environment to dilute the Cr (VI) released is lower than 0.1% of the emergy used in the coating process. The case study is an example of the application and evaluation of CP options (good operational practices, material and raw material changes, technological modifications, and product change) and is presented to motivate product manufacturers to prioritize environmental performance assessments to their products and services equally as well as to save manufacturers substantial time and efforts during their first attempts to implement CP actions.