Optimal Policies of Recycling, Storage and Disposal of Industrial Waste

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Abstract

In recent years, industries are paying more attention to environmental issues thanks to the rise of global environmental awareness. This research considers the roles of waste recycling and disposal companies in the green supply chain, and studies the issues of how to effectively process and recycle waste from industries.

This research develops three models (one-piece processing model, whole-lot processing model and two-stage processing model) based on various processes of industrial waste. Capacity utilization of processing waste, profits from recycled valuables, constant and processing time-dependent recycle rates are considered. Two strategies, multiple waste disposal cycles and multiple recycling cycles, are developed. Formulas for optimal recycling quantity and waste disposal cycle that minimize total costs are derived. Results from numerical experiment show how recycle rates affect optimal waste recycling and waste disposal cycles and how profits from recycled valuables influence optimal recycling quantity. Finally, the subject of investing on the improvement of recycle rate is addressed. Through experiment, it can be observed that optimal investment strategies and resulting total costs are varied in various scenarios. The findings from this research can serve as valuable reference in quickly making correct investment alternatives.

Keywords: Waste disposal, Waste recycling, Non-linear recycle rate