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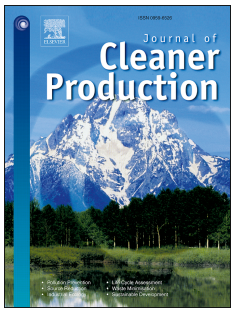

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Long-term Heat Integration in Multipurpose Batch Plants using Heat Storage

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ABSTRACT

Most scheduling methods are limited to the short-term scheduling case and solution of problems over long time horizons may prove challenging or impossible with these methods. Including additional considerations such as Heat Integration further complicates the problem. A model for the simultaneous optimisation of the schedule and energy usage in heat integrated multipurpose batch plants operated over long time horizons has been presented. The method uses a cyclic scheduling solution procedure. The proposed model includes indirect Heat Integration via heat storage, rather than just direct Heat Integration. This has not been considered in long-term Heat Integration models in current literature. Both the heat storage size and initial heat storage temperature are also optimised. The solution obtained over 24 h using the proposed cyclic scheduling model with direct Heat Integration for a multipurpose example was compared to the result obtained from the direct solution and an error of less than 6% was achieved.

KEYWORDS: Heat Integration, multipurpose batch plant, energy optimization, heat storage

1. Introduction

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