

## Distribution network design for fixed lifetime perishable products: a model and solution approach

### ABSTRACT

Nowadays, many distribution networks deal with the distribution and storage of perishable products. However, distribution network design models are largely based on assumptions that do not consider time limitations for the storage of products within the network. This study develops a model for the design of a distribution network that considers the short lifetime of perishable products. The model simultaneously determines the network configuration and inventory control decisions of the network. Moreover, as the lifetime is strictly dependent on the storage conditions, the model develops a trade-off between enhancing storage conditions (higher inventory cost) to obtain a longer lifetime and selecting those storage conditions that lead to shorter lifetimes (less inventory cost). To solve the model, an efficient Lagrangian relaxation heuristic algorithm is developed. The model and algorithm are validated by sensitivity analysis on some key parameters. Results show that the algorithm finds optimal or near optimal solutions even for large-size cases.

**Keyword:** Distribution network; Fixed lifetime; Perishable products