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Using Monte Carlo simulation to refine emergency logistics response models: a case study

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Abstract

Purpose – The purpose of this paper is to provide a framework for the development of emergency logistics response models. The proposition of a conceptual framework is in itself not sufficient and simulation models are further needed in order to help emergency logistics decision makers in refining their preparedness planning process.

Design/methodology/approach – The paper presents a framework proposition with illustrative case study.

Findings – The use of simulation modelling can help enhance the reliability and validity of developed emergency response model.

Research limitations/implications – The emergency response model outcomes are still based on simulated outputs and would still need to be validated in a real-life environment. Proposing a new or revised emergency logistics response model is not sufficient. Developed logistics response models need to be further validated and simulation modelling can help enhance validity.

Practical implications – Emergency logistics decision makers can make better informed decisions based on simulation model output and can further refine their decision-making capability.

Originality/value – The paper posits the contribution of simulation modelling as part of the framework for developing and refining emergency logistics response.

Keywords Modelling, Monte Carlo simulation, Emergency measures, Response time

Paper type Conceptual paper

1. Introduction

Over the past few years, the literature related to emergency logistics has greatly expanded. A number of emergency or emergency logistics plans and response framework have been developed by numerous agencies and governments around the world. However, many of these seem to be purely theoretical and relatively ineffective in their initial response or subject to unforeseen constraints. It is, therefore important to develop a more comprehensive approach and provide a holistic emergency logistics planning framework that key-related stakeholders can adhere to.

The purpose of this paper is to provide a framework for the development of emergency logistics response model. The proposition of a theoretical or conceptual model is in itself not sufficient. What is needed is to validate the proposed emergency response model through the use of simulation models.

The proposed planning framework focuses on the preparedness phase of emergency operations with a focus on responsiveness capability. Responsiveness is a key issue for

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