

# Planning and Scheduling Transportation Vehicle fleet in a Congested Traffic Environment

LAOUCINE KERBACHE<sup>1</sup> AND TOM VAN WOENSEL<sup>2</sup>

<sup>1</sup> HEC SCHOOL OF MANAGEMENT, TARIS, FRANCE.

<sup>2</sup> ERNDHOVEN UNIVERSITY OF TECHNOLOGY, THE-NETHERLANDS.

Transportation is a main component of supply chain competitiveness since it plays a major role in the (inbound, inter-facility, and outbound logistics). In this context, assigning and scheduling vehicle routing is a crucial management problem. Despite numerous publications dealing with efficient scheduling methods for vehicle routing, very few addressed the inherent stochastic nature of travel times in this problem. In this paper, a vehicle routing problem with time windows and stochastic travel times due to potential traffic congestion is considered. The approach developed introduces mainly the traffic congestion component based on queueing theory. This is an innovative modeling scheme to capture the stochastic behavior of travel times. A case study is used both to illustrate the appropriateness of the approach as well as to show that time-independent solutions are often unrealistic within a congested traffic environment which is often the case on the European road networks.