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Flow management of passengers and goods coexisting in the urban environment: Conceptual and operational points of view

Anna Trentini[a,b*], Nicolas Malhene[c]

[a]*EIGSI, 26 rue de vaux de Foletier, La Rochelle 17000, France*
[b]*ENSMP, 60 Bd Saint Michel, Paris 60 75006, France*
[c]*EIGSI, 26 rue de vaux de Foletier, La Rochelle 17000, France*

Abstract

Our research aims to define a model which constitutes a first framework to plan and to control both passengers and goods flows in the urban environment. It focuses on the sharing concept which means to make a joint use of transport resources between passengers and goods flows. The proposed concept leans on the statement that: "There is sufficient overlap between passenger & freight urban transport systems to be able to build on and integrate existing infrastructure of both passenger & freight systems" [1].

Consequently, to integrate passenger & freight flows in the existing urban transport systems, it is necessary to characterize this overlap, which means to quantify both flows.

Starting from freight flows, our paper presents a methodology aiming to define an appropriate sizing of delivery volumes by business type. The methodology has been implemented in a French medium sized city: La Rochelle.

Keywords: Urban transport; urban freight; public transport; sustainable mobility; network design

* Corresponding author. Tel.: +33-0-546458141; fax: +33-0-546458010.
E-mail address: anna.trentini@eigsi.fr

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1. Introduction

Both people and goods co-exist in the urban environment; the ones transported by individual vehicles or public transportation systems; the others by freight carriers, shippers, craftsmen, people. Their flows strongly linked and in interaction, compose the complex system of urban mobility [2]. In Europe, urban passenger transport accounts for a significant share of total transport in terms of passenger km [3] and urban freight transport accounts for about 34% of the total freight traffic in tons km [4]. Thus, an efficient and effective transport for passenger and goods is an essential element for a balanced European development. Facing this challenge, we are interested in finding new approaches to urban mobility. We devoted attention to the sharing concept, currently applied to public space design [5]. We transferred the sharing concept to the urban transport domain, considering the possibility of making a joint use of transport resources, between passenger and goods flows [6]. We conducted a field observation and realized different experiments have been implemented in cities leading to a large range of results with real cases of shared transport solutions. An inductive reasoning enabled us to move from a set of specific facts to establish some concepts and principles in order to manage all urban logistics related to passenger and freight transport together as a single logistics system. Starting from the statement that the total capacity of public urban transport is currently under used [1] we gathered a comprehensive package of detected shared transport solutions. We then conceived a radical new urban transportation system more equitable and efficient supporting economic development and able to increase consumer benefits as well as reduce environmental impacts. This paper is structured into three sections. The first section presents and analyses existing shared transport solutions. Section two presents a conceptual model to plan and to control the coexistence of passenger and goods flows in the urban environment. Last section proposes the operational point of view of our study and provides steps introducing an approach to implement our model.

2. State of the art

2.1. Survey on existing shared solutions

Different experiments have been implemented in cities leading to a large range of results, showing in many cases the difficulty in set up solutions or compromises which can be accepted by stakeholders. Unfortunately sporadic information on this topic is available in books, journals, magazines or on web sites. Through a literary review it is still possible to detect 14 cities that implemented 10 noteworthy shared solutions. Yet for most of them there is a lack of knowledge on the implementation processes and outcomes. These experiments are detailed below. In Barcelona two innovative shared solutions have been implemented. The first has been implemented in the context of the CIVITAS I MIRACLES project (2002 – 2006) (available on www.civitas.eu) and it is intended to make multi - use of lanes. That means the possibility to use lanes as priority bus lanes, during the peak hours and to convert on-street parking spaces into unloading spaces during the prescribed hours. Web-based information services give bus priority regulations through variable message signs.

The second experience regards Night deliveries. This solution aims to manage vehicle traffic in high density central business districts of urban areas delivering to retailers and shops in the inner city area during the night hours when the city is usually quiet and inactive. Typical times are between 10.00 p.m. and 7.00 a.m. Successful trials on night delivery have been made replacing a greater number of vehicles operating during day time by a fewer number of vehicles operating during night time [7]. Information on the Dublin and New York experiences is available on [8]. [9] [10]. Two interesting experiments have been proposed, one in London and another in Newcastle-upon-Tyne, aiming at recognizing lorries, along