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Before-after assessment of a logistics trial with clean urban freight vehicles: A case study in London

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Abstract

The paper addresses the potential role that can be played by clean vehicles especially cycles in conjunction with urban consolidation centres (UCCs) in reducing freight traffic and its environmental impacts in towns and cities. A trial is presented in which a major stationery and office supplies company making deliveries to customers in central London replaced their diesel vans with electrically-assisted tricycles and electric vans operating from a urban micro-consolidation centre located in the delivery area. The results show that the total distance travelled and the CO2e emissions per parcel delivered fell by 14% and 55% respectively as a result of this delivery system. The trial proved successful from the company's perspective in transport, environmental and financial terms and it has therefore decided to officially launch and continue the operation.

Keywords: Clean vehicles; urban freight; urban consolidation centre; impact assessment; before-after survey

1. Introduction

This paper focuses on the potential for clean vehicles including electrically-assisted cycles and urban consolidation centres (UCCs) to alleviate local environmental and traffic problems within urban areas. The paper begins with an overview of using cycles for urban freight and their potential advantages and disadvantages. It then considers the role and purpose of UCCs and their potential benefits. The results of a UCC trial that took place in the City of London between 2009 and 2010 are then presented. This involved the use of a consolidation centre in the delivery area from which electrically assisted tricycles and electric

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vans were operated for delivery to receivers. The traffic and environmental impacts of the operation before and after the introduction of the UCC and electrically-assisted tricycles and electric vans are quantified.

2. Using cycles for urban freight transport

Cycles have long been used for the distribution of goods in urban areas. For instance, in the early twentieth century it was common for them to be used in towns and cities in the UK for the delivery of consumer goods from local shops to customers' homes (such as bakers, butchers, newsagents and grocers). They also became commonly used at this time for the sale of ice cream during warmer months. In addition, many postal services have traditionally used bicycles for urban postal delivery work. However, there was a marked decline in the use of bicycles for urban deliveries from the mid-twentieth century due to factors including: the greater availability of cars and vans (due to falling purchasing and running costs), the comparatively lower operating costs per unit carried of cars and vans (due to their payload advantages over cycles), and the growing suburbanisation of urban areas (which reduced the viability of cycles given the lower population densities and greater travel distances involved).

Recent developments in cycle technology have helped to make cycles feasible for urban freight transportation once again. These developments include: the lightweighting of materials from which cycles are manufactured, the design of cycles with larger carrying capacities (in terms of both weight and volume) which includes the development of trailers, and the introduction of electric motors which assist the rider, especially when travelling uphill. Freight cycles range in payload from approximately 25 kg for conventional two-wheeled machines with a front basket or tray to approximately 250 kg for three and four wheeled cycles with rear-mounted boxes, cages or trailers. Electrically-assisted cycles have a typical speed of approximately 15 kilometres per hour in free-flow conditions.

A recent literature review of the uses of cycles for urban freight transport identified them as having been used either currently or during the last decade in countries including France (Paris, Bordeaux, Dijon and Rouen), the Netherlands (Arnheim, Locheim, Nijmegen and Apeldorn), Belgium (Antwerp), the UK (including London, York, Nottingham, Cambridge) and the USA (New York, Santa Cruz and other Californian cities) [1]. In addition, cycles are widely used for the delivery of goods in towns and cities in developing countries [2]. In these locations in which cycles are currently being operated for urban freight transport they are being used to carry a range of products including documents and letters, parcels, groceries, and non-food retail goods, fresh cut flowers, sandwiches. They are used for both business-to-business deliveries and business-to-consumer deliveries (i.e. home deliveries), and are operated both on an in-house (own-account) and third party basis.

The advantages offered by freight cycles for urban distribution work include:

- They require less kerbside loading space than a motor vehicle.
- They are easier to manoeuvre in heavily congested situations than motor vehicles.
- In some cities they have dedicated lanes and can also use bus lanes (unlike motor vehicles)
- They can potentially access urban locations closed to motor vehicles at certain times of day
- They do not emit greenhouse gases and are producing very low noise levels
- They have lower purchase and running costs than motor vehicles
- They have smaller space requirements for overnight storage than vans and other goods vehicles
- They are not usually subject to on-street parking charges or parking fines
- They are not subject to the charges imposed by the London Congestion Charging Scheme
- Cyclists do not require driver licensing
- The public has a positive public perception of cycles especially as a result of them having a far lower environmental impact than motor vehicles