THE ROLE AND TREATMENT OF LIGHT GOODS VEHICLES IN URBAN FREIGHT TRANSPORT

Michael Browne, Julian Allen, Stephen Anderson
Transport Studies Group, University of Westminster,
35 Marylebone Road, London, NW1 5LS, UK
e-mails: M.Browne@westminster.ac.uk, Allenj@westminster.ac.uk,
S.M.Anderson@westminster.ac.uk

Abstract

This paper examines the importance of light goods vehicles (LGVs – i.e. commercial vehicles up to 3.5 tonnes gross vehicle weight) in urban areas. The paper discusses the issues that have contributed to the increase in the numbers and total activity levels of these vehicles in the UK. The differences in the policy treatment of the vehicles in comparison with heavy goods vehicles (HGVs) is considered. The paper shows that the LGV fleet has grown by 20% over the past decade and that LGV vehicle kilometres have increased by 38% since 1990. Much of this growth in LGV use has taken place in urban areas. Insight into the activities for which LGVs are used is provided by a summary of results from a recently-published UK government survey of privately-owned LGVs, together with the authors research in two sectors in which LGVs are extensively used: parcels operations and telecommunications servicing. The paper raises important questions that need to be considered by city planners in relation to policies concerning LGVs .

Keywords: Light goods vehicles; Freight transport; Goods; Services
Topic Area: B5 Urban Goods Movement

1. Introduction

This paper is concerned with light goods vehicles (i.e. commercial vehicles up to 3.5 tonnes gross vehicle weight). These vehicles have received relatively little attention in terms of either official data collection or detailed research into their activities. However, more attention is necessary given the large numbers of these vehicles and the distance that they travel, especially in urban areas. Light goods vehicles (LGVs) are used to perform similar goods delivery and collection tasks to heavy goods vehicles (HGVs – i.e. goods vehicles with a gross weight in excess of 3.5 tonnes). In addition LGVs are also used for a wide range of other commercial activities (especially in the service sector), and are also commonly used for private trip purposes (such as shopping and leisure trips) by people who have one available for work reasons, and increasingly are associated with service industry activities where freight and goods movement may be a small part of their travel objectives.

There are several different terms used by organisations to describe these vehicles (including vans, light vans, light goods vehicles, light commercial vehicles etc). The term light goods vehicles (LGVs) is used throughout this paper.

2. Factors influencing the use of LGVs

LGVs are used for both goods trips and service trips. Examples of each of these types of trip are shown in Table 1. It should be noted that service trips can include the transportation of goods as part of the trip.

Table 1: Examples of goods and service trips where LGVs are used

Goods trips	Service trips
• Parcels deliveries to businesses and private addresses • Grocery home deliveries • Shop restocking at cash and carry • Florist delivering flowers (e.g. Interflora)	• Plumber travelling to job • Computer field engineer travelling between customers • Builder travelling to provide quotation for potential work

In addition LGVs, unlike HGVs, are also used for private trip purposes such as personal shopping trips, visiting friends and relatives and leisure trips. The data for these types of activity appear in personal travel surveys rather than freight studies and the two types of survey have not been brought together to give a coherent perspective on LGV activities and significance.

There are a number of factors that are likely to be partly responsible for the growth in the size of the LGV fleet and the total vehicle kilometres it travels in Britain in recent years.

In terms of transporting goods the following are likely to have encouraged the use of LGVs:

- Reduction in stockholding levels/move to JIT distribution systems – as companies have moved towards logistics systems which aim for stock reduction there have been reductions in delivery quantity and therefore encourages the use of smaller vehicles;
- Increase in same day and time-critical parcel deliveries – in the parcels sector the demand for faster services has resulted in greater use of LGVs;
- Shortage of heavy goods vehicles (HGV) drivers/Changes in driving licence legislation requiring drivers to pass additional driving tests for HGVs – companies are finding it increasingly difficult to recruit HGV drivers and some are therefore opting instead for LGVs which can be driven on standard car driving licences, thereby significantly expanding the potential driver base to select from;
- Increase in operating restrictions on HGVs in urban areas – restrictions imposed by local authorities on the routes available to HGVs may be having an effect on companies' vehicle selection policies;
- Growth of home delivery sales – home shopping and delivery has become increasingly popular in the last few years and the majority of these deliveries that involve groceries and parcels are made by LGVs which are ideally suited to the products and residential driving conditions;
- Growth in number of households - reduction in average household size (due to people living longer, changes in family composition and people choosing to live alone is resulting in more households and hence more residential delivery addresses for home deliveries;
- Growth in home improvements – the increase in home extension and improvement is resulting in greater flows of building products to homes with many builders using LGVs;
- Increase in value density, especially of consumer goods will emphasise small vehicles at the ends of the supply chain.

In terms of service operations the following are likely to have encouraged the use of LGVs:

- Outsourcing of service functions to specialist companies during the last decade - this has tended to result in a wide range of services provided to buildings and to homes that require vehicle trips;

- Increase in rapid response servicing (e.g. computer repairs etc.) – this has resulted in increases in LGV trip making in order to rectify such problems;
- Development and use of more technological and communications equipment that requires installation, planned servicing and emergency repairs – these sectors primarily use LGVs for their engineers and servicing staff;
- The installation and maintenance of new telecommunication networks (e.g. cable networks);
- Growth in the number of households has led to greater trip-making in order to meet these servicing needs many of which will take place in LGVs.

In addition, LGVs have become popular due to their flexibility, allowing them to be used for a range of tasks (both work and leisure), and their use may have also been encouraged by tax incentives which have made them attractive compared with company cars.

3. LGVs and transport policy

Existing policy measures for LGVs and HGVs differ in several ways in Britain. These differences are summarised in Table 2.

Table 2: Differences in policy measures for LGVs and HGVs in the UK

Policy area	**Difference in treatment between LGVs and HGVs**
Driving licence requirements	LGVs up to 3.5 tonnes can be driven with a standard car driving licence (Category B vehicle licence). Rules differ for driving vehicles over 3.5 tonnes gvw depending on when the category B driving licence was acquired.
Drivers' hours legislation	Drivers of LGVs are not subject to EU Drivers' Hours Regulations. As part of British Domestic legislation in the Transport Act 1968 the driver of an LGV when engaged in most professional activities should not drive for more than 10 hours per day and should not be on duty for more than 11 hours on driving days. Tachographs are not fitted in LGVs, thereby making the legislation difficult to enforce.
Operator licences	No requirement for an operators' licence (O-licence) for LGV (and therefore no need to demonstrate good repute, appropriate financial standing or professionally competent)
Speed limits	There are different speed limits for car derived vans up to 2 tonnes gvw, other LGVs and vehicles up to 7.5 tonnes gvw, and goods vehicles over 7.5 tonnes gvw
Operating restrictions (especially in urban areas)	LGVs not always subject to same time and access restrictions as imposed on HGVs.

Some of these differences in transport policy may have actively encouraged the acquisition of LGVs. Policy makers have tended to pay very little attention to LGVs in comparison with HGVs. However with the growth in LGV traffic and the relative inefficiency of LGVs compared with HGVs when used to carry goods (in terms of road space and energy requirements per unit of product) it may be necessary for policy makers to reconsider whether such policy differences need to be reconsidered.

4. Data showing growth in LGV fleet and its activity

4.1 The LGV fleet in Britain

The LGV fleet has grown significantly in recent years, increasing by approximately 20% over the last ten years. This has far outstripped the growth in the HGV fleet during the last decade (the HGV fleet has only increased by 4%) - as shown in Table 3. In fact, the growth in the LGV fleet was similar to the growth in cars over this period (the number of cars increased by approximately 24% between 1992 and 2002).

Table 3: Changes in LGV and HGV stock in Britain, 1992-2002 (DfT, 2003a and b)

	1992	2002	% change 1992-2002
Light goods vehicles	1,951,000	2,343,000	+20.1%
Heavy goods vehicles	415,000	433,000	+4.3%

There was a total LGV fleet in Britain of 2.43 million vehicles in 2002. This compares with an HGV fleet of 433,000 vehicles (which is made up of 316,000 rigid vehicles and 117,000 articulated vehicles) (DfT, 2003b). This does not mean that HGVs carried less tonnage, more that the mean sizes and loads increased.

Light goods vehicles are manufactured with several different body types. The two most common body types for light goods vehicles are (i) car-derived vans (which from the outside are visually very similar to cars on which they are based but have no rear seats – these vehicles have gross weights of up to 3.5 tonnes) and (ii) panel vans (which are usually between 1.8 and 3.5 tonnes gross vehicle weight). Other body types include pick-ups, luton vans and box vans.

4.2 LGV traffic nationally

As the number of LGVs licensed in Britain has risen significantly in recent decades, so too has the total distance travelled.

In total, LGVs travelled 94% more vehicle kilometres than HGVs in Britain in 2002. Growth in vehicle kilometres travelled by LGVs between 1990 and 2002 was greater than the growth in HGV vehicle kilometres. The growth in LGV vehicle kilometres was also considerably greater than that for cars and taxis – see Table 4.

Table 4: Billion Vehicle Kilometres Travelled in Britain (DfT, 2003a)

	1990	2002	% change 1990-2000
Cars and taxis	335.9	392.4	+17%
LGVs	39.9	55.0	+38%
HGVs	24.9	28.3	+13%

Using this data it is possible to calculate the average distance travelled per year for LGVs and HGVs. The average for LGVs was approximately 23,000 kilometres during 2002, compared with an average of approximately 65,000 kilometres for HGVs. (It should however be noted that there are significant variations in average annual distance travelled among HGVs with for example, 3.5-7.5 tonnes gvw rigid vehicle covering 29,000 kilometres per year in 2002 and articulated vehicles over 33 tonnes gvw covering 96,000 kilometres (DfT, 2003c). Differences in the average annual distance travelled by LGVs and HGVs are related to the type of activities that they are used for. LGVs are typically used for local delivery work and service activities, while the larger HGVs are predominantly used for moving goods over long distances.

Figure 1 shows the growth in the total vehicle kilometres performed by all LGVs, HGVs and cars/taxis in Britain between 1990 and 2002.

The most recent traffic statistics show a further significant growth (6 per cent) in LGV traffic in Britain between the third quarter of 2002 and 2003. Although LGVs comprise only 12 per cent of total traffic, they accounted for about two-fifths of the growth in traffic over the last year (this is the same as the growth accounted for by cars – even though there are approximately 10 times more cars than LGVs) (DfT, 2003d).

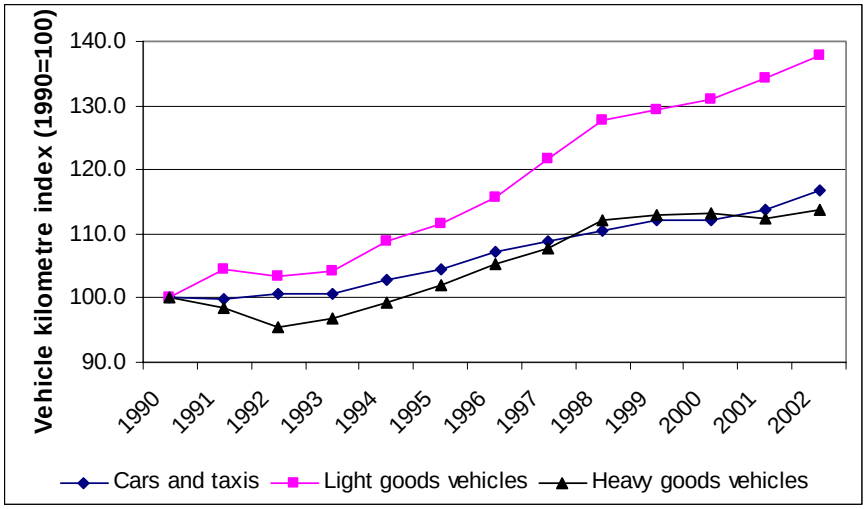

Figure 1: Vehicle Kilometres Travelled in Britain (DfT, 2003a)

4.3 LGV traffic in urban areas

Because of the types of activities that LGVs are used for, they perform a far greater proportion of their vehicle kilometres in urban areas than HGVs. In 2002, LGVs performed 36% of their total distance travelled on urban roads. This compared with 16% on urban roads for HGVs (DfT, 2003e).

The example of LGV trips into and out of London help to indicate the scale of LGV activity in an urban area. Figure 2 shows the changes in commercial vehicle traffic volumes crossing the central cordon[1] in London in both directions over a 24-hour period on a typical weekday between 1983 and 1999. These figures show that LGVs are by far the most common form of commercial vehicle crossing each cordon, followed by medium goods vehicles (rigid vehicles over 3.5 tonnes gvw), and heavy goods vehicles (defined in this dataset as articulated vehicles over 3.5 tonne gvw) (TfL, 2004).

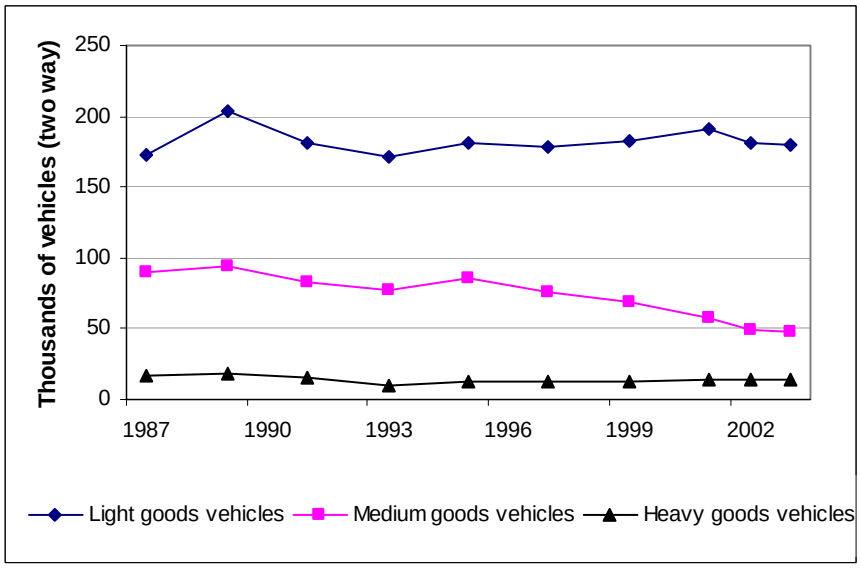

Figure 2: Goods vehicle movement at London central cordon, 1983-2003 (TfL, 2004)

5. LGVs – What are these vehicles used for?

Given the significant growth in the number and activity of LGVs it is important to understand the uses to which these vehicles are being put. Adding to the difficulty in

studying the use of these vehicles is that they can be used for a wide range of different purposes including goods movement, service activities and personal trips. Many of the vehicles are unmarked so provide no clear visual information about the use to which they are being put.

It is therefore difficult, and often impossible, to distinguish trip purpose (e.g. parcels delivery, plumber visiting customer, computer field engineer driving to next job etc.) by observation, and also to distinguish whether trip is taking place for commercial or personal reasons. Even when the vehicle has a company livery this does not necessarily mean the vehicle is engaged in a commercial trip (for instance, the driver could be using the vehicle to go shopping or visit friends and relatives). It is therefore necessary to use a wide range of research techniques to study the activity of LGVs. Table 5 indicates a range of different techniques available depending on the information required.

As Table 5 indicates, in order to investigate trip purpose and trip patterns for LGVs it is necessary to conduct survey work. Techniques commonly used to study other types of travel behaviour such as trip diaries and roadside interviews could be used, and there is also the potential to use in-vehicle monitoring equipment and satellite tracking systems as these become more commonly used by companies.

There have been relatively few studies of LGV activity and use, and LGV trips have typically been ignored in freight data collection and modelling. There is therefore little existing data available about LGV use. However, there are two sources which provide some insight into this issue: i) a recently-completed UK government survey into LGVs and ii) qualitative research that the authors have carried out in several sectors in which much use is made of LGVs.

Table 5: Possible techniques for gathering LGV information

Information required	Possible Techniques
LGV traffic levels*	Manual or automatic counts
LGV trip purpose, trip patterns, origin and destination data	Trip diaries, personal travel surveys, roadside interviews and in-vehicle monitoring equipment
LGV performance and utilisation	In-vehicle monitoring equipment, manual records kept by companies, vehicle track testing
Company fleet decisions	Questionnaires, interviews and focus groups
Likely reactions of companies and drivers to policy measures/new initiatives by companies	Interviews and focus groups
LGV trip generation and attraction rates	Land use surveys

Note: *LGV traffic levels are difficult to obtain from automatic counting because it is not possible to distinguish on vehicle length between and LGV and a car. Manual counting is also subject to a high degree of error as visually distinguishing a large LGV from a small HGV is not easy. This is usually done by determining whether the rear axle has single of double tyres, but with fast moving and/or high volume traffic this is not always possible.

5.1 Department for Transport survey work

The Department for Transport in the UK recently decided to carry out survey work into LGV use. Two separate surveys are being conducted: one of which is investigating company-registered LGVs and the other privately-registered LGVs (i.e. the vehicle is registered to a private individual rather than to a company). The former is being carried out through a statutory survey, while the latter is carried out as a stand-alone household survey. These surveys are collecting information about the vehicle itself and the journeys it makes over a two-day period.

The company-registered LGV survey is still being carried out, but the results from the privately-registered LGV survey were published in January 2004 (DfT, 2004). Figure 3 shows the reasons for these privately-registered LGV trips. Approximately two-thirds of

the trips were for business purposes, and one-third for personal use (including shopping and social trips). Table 6 shows the average trip distances by reason for vehicle use.

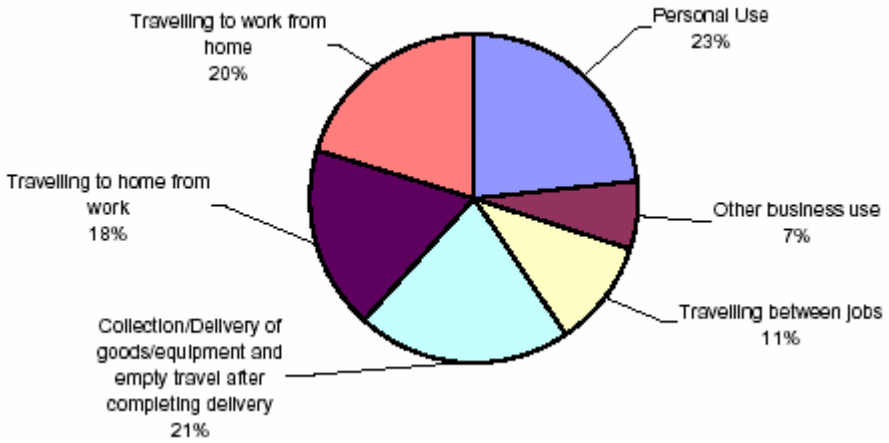

Figure 3: Trips by privately-registered LGVs by reason for use (DfT, 2004)

Table 6: Average trip distances by privately-registered LGVs by reason for use (DfT, 2004)

Reason for use	**Average trip distance (vehicle kilometres)**
Travelling to work from home	21
Travelling to home from work	21
Collection/Delivery of goods/equipment and empty travel after completing delivery	19
Travelling between jobs	17
Other business use	11
Personal Use	13

Table 7 shows the types of business for which privately-registered LGV trips are made and the importance of each business in terms of vehicle kilometres and trips. As can be seen, the construction industry accounts for the most vehicle kilometres (41%) and the most vehicle trips (38%). The next most important business types are personal use and wholesale and retail trade, repairs and hotels.

Table 6: Proportion of vehicle kilometres and trips by privately-registered LGVs accounted for by business types (adapted from DfT, 2004)

	Vehicle kilometres (% of all business types)	**Vehicle Trips (% of all business types)**
Agriculture, Forestry and Fishing	6	8
Energy and water supply	3	2
Other manufacturing industries	3	3
Construction	48	45
Wholesale & retail trade, repairs and hotels	15	17
Transport and communication	9	6
Banking, finance and insurance, business services and leasing	1	2
Health, Social work and other community services	1	3
Education, public admin & defence, extra-territorial organisation	1	1
Other services	13	13

In terms of the type of products carried by privately-registered LGVs, construction related machinery is by far the most important category (constituting approximately 30% of total vehicle kilometres). Twenty eight percent of vehicle kilometres are empty legs of journeys.

5.2 Research into specific sectors using LGVs

Research was carried out be the authors into distribution and service sectors that are major users of LGVs in urban areas. Three sectors were studied: i) parcels and ii) telecommunications. This was carried out through interviews with companies operating in these sectors. The purpose of this research was to obtain an understanding of the role LGVs played within these sectors and the specific issues faced by companies using LGVs in urban areas.

5.2.1 Parcels carriers

LGVs are widely used within the parcels and mail sector for final delivery in urban areas. Most companies operating in this sector operate a national network of distribution hubs together with local collection and delivery depots. Goods sent by a customer are collected from them by a vehicle operated from the local depot. These goods are then sent during the evening from the local depot to the regional distribution hub on HGV trunking vehicles, and are then sorted by delivery location and distributed during the night to local depots for final delivery by vehicles operated from this depot on the following day. Most packages are sent on a next day basis.

Collection and delivery work from the local depot (which is often suited either in or at the edge of an urban area is often carried out LGVs in dense urban area. This is because these vehicle are suited to the quantity/weight of goods carried on a single delivery round, and are manoeuvrable in narrow urban streets. Deliveries are normally made during the morning and collections take place during the afternoon. The number of deliveries in and around the urban area tends to far exceed the number of collections that are made, due to the fact that are more points of consumption than production in urban areas.

The vast majority of deliveries take place from Monday to Friday. Some deliveries are made on a Saturday for packages that have been sent using the premium delivery service. Deliveries are not normally made on a Sunday.

Issues faced by parcels companies using LGVs in urban areas include:

- Rising traffic levels are making journey times into and around the urban area increasingly unpredictable
- Many premises in city centres have no off-street delivery area and therefore vehicles need to finding parking space on-street and deliveries are made across the pavement through the front door. Finding parking on-street parking spaces close to the point of delivery can be difficult due to other delivery vehicles, cars, and restrictions on access times and kerbside loading times. This problem is multiplied for parcel carriers as a driver will make deliveries to a large number of addresses (often between 50-100 addresses) on a single vehicle round.
- As access and loading time restrictions become more stringent, it can become necessary for parcel carriers to operate a greater number of vehicles and perform additional journeys and mileage to achieve the same volume of deliveries.
- Some receivers of goods are keen to check each item delivered while the driver is still present. This can be very time consuming in the case of deliveries involving many items.

The sample vehicle round data collected from a parcel carrier operating an LGV in an urban area helps to illustrate the complexity of this type of delivery operation.

- Morning delivery round in city centre:
  - 176 items are delivered on the round.
  - Total distance travelled is 35 kilometres.
  - Total round takes 4 hours 20 minutes.
  - The average speed over the round is 8 kilometres per hour.
  - The average distance travelled per item delivered is 0.2 km.
- Morning delivery and collection round in outer urban and rural areas:
  - 64 items are delivered on the round.
  - Total distance travelled is 174 kilometres.
  - Total round takes 6 hours 30 minutes.
  - The average speed over the round is 27 kilometres per hour.
  - The average distance travelled per item delivered is 2.7 km.

5.2.2 Telecommunications installation and servicing company

The company interviewed install and service telecommunications equipment for commercial and residential customers on a nationwide basis. Each engineer working for the company is provided with an LGV. The engineers' work is registered through a call centre and then allocated to an engineer based on their current workload and location.

Some engineers travel home in their LGVs and park them at home overnight, while others who have no parking space at home will park them at a company depot overnight. Engineers who work from home travel directly to their first job without visiting the depot – this helps to reduce their total travel distance.

Engineers carry a range of spare parts in their LGVs. However, the need often arises for additional spare parts for a particular job. These are either couriered to the engineer's home or the address at which the servicing work will take place (often also in an LGV). Alternatively, the company also operates "drop lockers" – these are locations within urban areas that engineers can visit to pick up parts that they need.

Engineers working in central London complete, on average, about three to four jobs each day (however this can vary between one and ten jobs depending on the complexity and scale of the work). Engineering is carried out between 07:30 and 20:00, although most work is carried out between 08:00 and 17:30. The company offers rapid response servicing: aiming for a five-hour response time for commercial customers.

The service engineers encounter many similar problems to goods vehicle drivers in urban areas. These include problems in driving around urban areas caused by: (i) traffic congestion, and (ii) policy measures that restrict vehicle access at certain times of day in particular city centre areas. In addition they also commonly experience problems associated with customers who are not available when the engineer arrives at the premises.

However, the greatest problem faced by the engineers in urban areas are related to parking their LGVs.

Few of the urban premises studied have any off-street facilities for delivery or service vehicles. Of the premises that do have off-street facilities, most tend to be used for the parking of employees' cars and for goods vehicle unloading. But, other than in the case of premises with extremely large off-street facilities, there tends to be no parking provision made for service vehicles visiting the premises.

From our interviews with service companies, their engineers typically have to park their vehicles on-street when visiting customers' premises to carry out servicing tasks. Finding a place to park a service vehicle on-street is even more difficult than finding a place to pull up on-street in a goods vehicle to make a delivery or collection for several reasons:

- In the UK service vehicles parked on-street while service engineers are working in the premises are not covered by the loading and unloading allowances given to goods vehicles making deliveries to the premises, because it does not constitute a loading/unloading operation. Instead they are treated in the same way as private cars

and other motor vehicles. This reduces the number of places service vehicles can be parked in comparison with where goods vehicles can be left when unloading. This can result in service engineers having to park significant distances from the customer's premises. This is time consuming and can be difficult if the engineer requires tools and other heavy equipment in order to carry out the servicing.

- Many service tasks take longer to perform than goods delivery and collection. Therefore the service vehicle will have to be parked for longer than the goods vehicle. This can further reduce the number of places where a service vehicle can be parked (i.e. a long-stay parking space is often required in these situations).
- In some cases it is difficult for the service engineer to estimate how long it will take to perform the servicing task at the premises. If the vehicle is parked in a place where parking time is limited or a parking meter has to be used, it can sometimes be necessary for the service engineer to return to the vehicle and move it to another parking place during the course of the servicing work at the premises.

Service engineers often park illegally in order to provide a service to their customers. As well as receiving parking tickets, illegally parked service vehicles can also be (i) clamped and (ii) towed away at the request of a traffic warden/parking attendant. If the engineer returns to their vehicle to find it either clamped or towed away this obviously has a significant impact on their ability to carry out their daily service tasks for all their customers.

6. Conclusions

This paper has shown that LGVs are becoming increasingly important in the UK both in terms of vehicle numbers and their total traffic levels. Much of this growth in LGV activity is taking place in urban areas.

These vehicles are being used in a range of important tasks, both in delivering goods and providing services to commercial organisations and private individuals. They have become the vehicle of choice in the final leg of many supply chains.

The increase in the use of LGVs in urban areas raises a number of important policy questions for city planners and policy makers. These include:

Parking and loading issues – how to make provision for the parking needs of LGVs being used for servicing activities given the existing pressures for kerbside space from other road users.

- Road space issues – how LGVs should be treated in relation to the allocation of road space. For example, many bus lanes have been implemented in the UK which are restricted to the use of buses, taxis and cyclists during restricted hours. However, a few experimental bus and lorry lanes have been implemented that lorries are also permitted to use. This raises questions about the fairness and justification of excluding LGVs from such special treatment.
- Policing and enforcement – making provision for LGVs involved in particular tasks is problematic due to difficulty of easily identifying what the vehicle is being used for. This identification issue together with the large number of LGVs operated makes it very difficult to provide for the needs of certain LGVs as it may well prove to be unenforceable.
- Whether LGVs should be included in policies aimed at HGVs. For example, in London a feasibility study for a Low Emission Zone was recently carried out. In such a scheme only vehicles meeting certain emission standards would be allowed to enter a specified urban area. However, this research showed that including LGVs in the scheme would result in the need for more expensive, automated enforcement systems due to the numbers of vehicles that would be involved (Watkiss et al, 2002). In addition, the costs to industry of applying such policies to LGVs is likely to result in extremely high compliance costs for industry given the number of LGVs operating in the urban area.

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Endnotes

[1] The central cordon encloses an area within a radius of 1½-2 miles of Aldwych.