

The Contribution Motorcycles
can make to
Sustainable Transport
in London

Gerard Livett

University College London

MPhil Town Planning

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Abstract

This thesis examines the contribution motorcycles can make to sustainable transport in London. Following a literature review, and some definitions of the subject matter, there is an analysis of transport data, including the historic use of motorcycles, and policy documents at a national, regional and local level informs a discussion on the utility of motorcycles within a sustainable transport strategy, and its implementation by London Boroughs. As well as examining travel patterns in London, the thesis details the characteristics of London motorcyclists and what differentiates them from riders elsewhere in the UK.

The thesis considers some issues associated with the use of motorcycles that help inform policy and strategy at both the national and the local level. These include safety, emissions, noise, congestion and use of the road space.

These issues are then tested through case studies of policies and strategies produced by two the City of Westminster and the London Borough of Harrow.

The final section compares the characteristics of motorcycles against the requirements of a sustainable transport system and summarises the positive and negative contributions that motorcycles can make.

This thesis attempts to answer the questions:

- Do motorcycles represent a more sustainable transport mode than the private car in Greater London?
- Could an increase in motorcycle use, at the expense of either car or public transport use, have a significant impact on the sustainability of transport in London?
- Would encouraging motorcycle use present a more sustainable approach to London overall, in terms of secondary environmental measures?
- What role can land-use planning have in assisting motorcycle use?

The thesis concludes that motorcycles do have a role to play in helping to achieve a more sustainable transport system in London, but this is to some extent, dependent on the type and location of journey the vehicle is used for. The thesis also concludes that increasing motorcycle use would be beneficial to motorcyclists' road safety, and how motorcycling would be a beneficiary of policies intended to reduce car use.

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Abbreviations

ACEM	Association des Constructeurs Européens de Motocycles
BMF	British Motorcyclists' Federation
CA	Countryside Agency
Defra	Department for the Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
DfT	Department for Transport
DSA	Driver Standards Agency
DTLR	Department of Transport, Local Government and the Regions
DVLA	Driver and Vehicle Licensing Agency
FEMA	Federation of European Motorcycle Associations
GAGM	Government Advisory Group on Motorcycling
GLA	Greater London Authority
IHIE	Institute of Highway Incorporated Engineers
ILIP	Interim Local Implementation Plan
KSI	Killed or seriously injured
LBI	London Borough of Islington
LIP	Local Implementation Plan
LMWG	London Motorcycle Working Group
MAG	Motorcycle Action Group (UK)
MCIA	Motorcycle Industry Association
MCRG	Motorcycle Crime Reduction Group
MTS	Mayor's Transport Strategy
MPTWV	Mechanically Propelled Two Wheel Vehicle
NMC	National Motorcycle Council
ODPM	Office of the Deputy Prime Minister
PTW	Powered Two Wheeler
SDS	The Mayor's Spatial Development Strategy (The London Plan)
STS	Sustainable Transport Strategy
TWMV	Two Wheel Motor Vehicle
VOSA	Vehicle and Operator Services Agency
W2W	Wheels to Work
WCC	Westminster City Council

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Part One

Introduction

This thesis will examine the relationship between aspects of sustainable transport and motorcycling as expressed in national and local policy and through practical implementation in London.

It will also analyse the contribution motorcycles can make to sustainable transport in general and in London in particular.

The thesis will test the hypothesis that motorcycles could make a significant impact on sustainable transport in London.

The thesis has a number of cross-cutting themes which intertwine to give a picture of how motorcycles can contribute to sustainable transport in London.

These themes are:

- The role of motorcycles in the transport mix – the motorcycle as a transport alternative.
- The wider role of transport and its importance to the functioning of London.
- The sustainability impact of transport in London.
- The contribution that motorcycles can make to assisting sustainability.

The thesis will also explore some of the policy options available to transport planners to assist motorcycling achieve a greater modal share of surface transport.

Thesis Questions

The thesis has 4 basic research questions:

- Do motorcycles represent a more sustainable transport mode than the private car in Greater London?
- Could an increase in motorcycle use, at the expense of either car or public transport use, have a significant impact on the sustainability of transport in London?
- Would encouraging motorcycle use present a more sustainable approach to London overall, in terms of secondary environmental measures?
- What role can land-use planning have in assisting motorcycle use?

Importance of the topic

A casual examination of surface traffic in London would indicate that there is a significant problem with congestion on the roads. On-going trends in vehicle ownership and use, combined with the expected increase in London's population over the next few years, could, if left unchecked, lead to gridlock and a severe deterioration in air quality. Officials at Transport for London privately admit that large parts of the road network are effectively operating at capacity, although Mannings (2006) argues that some congestion is manufactured by traffic management policies. If the growth in households envisioned in the London Plan (GLA, 2004a) is to be accommodated without an increase in road capacity, the issue of creating a more efficient, and more sustainable, transport system in London is essential.

It is argued by many environmental campaigners that addressing the threat of global warming should be a major priority in transport planning and management. Transport contributes approximately 22% of the UK's CO₂ emissions. To date, the CO₂ emissions from increases in road traffic have been largely offset by improvements in vehicle efficiency. In the future, further fuel efficiency improvements are unlikely to keep pace with traffic growth (Foley & Ferguson, 2003: 1).

The role that motorcycles can play in the transport mix has been an area that has not received much academic attention (Burge *et al*, forthcoming). The transport debate appears to be organised in a series of binary oppositions: public versus private transport; motorised versus non-motorised transport. As will be shown later in the thesis, motorcycle use has increased in recent years, and at a much faster rate than either cycling or car use, but this has not been reflected in the literature.

An examination of the available literature also reveals that there is a lack of research on motorcycles as a transport alternative, and whether this mode of transport could make a significant impact on transport sustainability in a large metropolitan area such as London. This thesis examines the impact current motorcycle use makes on the sustainability of London's transport system. It will also explore the policy steps that could be implemented to increase the significance of motorcycling as a potential staging-post to achieving higher levels of sustainability with respect to personal transportation.

Thesis Structure

This thesis has been divided into a number of sections. The first is an introductory section in which some of the literature relating to sustainable transport, motorcycles and traffic growth is reviewed; definitions of the subject matter are outlined and the research methodology behind the thesis is presented

The second section explores the background of the research area. It outlines the historical background of transport and the role of motorcycles within the transport mix, and details how policy with regard to motorcycles and sustainable transport has evolved over recent years. It also examines some of the use issues associated with motorcycling, and how these could contribute to a sustainable transport system.

The third part of the thesis presents a case study to examine how a central London transport planning authority has approached the question of sustainable transport, the policies it has implemented with respect to motorcycles, and how these aspects relate to each other.

The final part of the thesis is a synthesis of the preceding sections, with a discussion of the issues that have been raised, and the findings summarised in a conclusion. This section also contains suggestions for further research that could be undertaken in this area.

Literature Review

An initial search of the available literature on transport and motorcycles revealed very little that was of direct relevance to the subject matter of this thesis. Much of the available road-related transport planning, and sustainable transport, literature concentrates on managing or mitigating the effects of the growth of road transport. This includes utilising elements of new and alternative technology in cars, rather than considering motorised alternatives to the private car. The main strands that emerge from the literature relating to motorcycles are related to road safety or social science perspectives.

This section examines some of the strands relating to sustainable transport and the wider transportation debate. It begins with a wider exploration of the concept of sustainable transport, and examines some approaches to reductions of travel dependency and finishes with a brief examination of some of the more social science literature. The issue of road safety is discussed in the second part of the thesis.

Sustainable Transport and Sustainable Development

The concept of sustainable transport is very difficult to define. One fundamental argument that emerges from the sustainable development and related sustainable transport literature is that unsustainable development is a product of industrialisation; while an awareness of the negative consequences of development are a product of the post-modern age. Cathy McKenzie notes that:

‘Transport can be seen as encapsulating all that can be seen as good and bad with modernity, and our relationship to it reflects the paradox that lies at the heart of the modernist project. Transport, like modernity itself, can be likened to a two-edged sword, the offer of opportunity and possibility like no other age, but against which is matched risk and danger. Earlier phases of modernity were characterised by the possibility and optimism that emerging transport technologies could offer. The car, in particular, emerged as a powerful symbol of freedom and possibility and was emblematic of the mass consumption that characterised the Fordist era of production, symbolising both status and wealth within the capitalist system. But as transport systems

have continued to develop, this has become matched with an increasing awareness of the risk and danger that a rapid expansion of travel poses both for ourselves and our environment.' (McKenzie, 2003: 19).

In a system that is predicated on economic growth based on the exploitation of the earth's natural resources, the market generates externalities, the cost of which are borne by society as a whole. In the latter part of the twentieth century, a growing recognition of the environmental costs of capitalism developed. This has been allied to a political movement that calls for business not just to be held accountable for the costs imposed on society from environmental damage and associated restoration costs, but also to make business pay those costs under the 'polluter pays' principle. Linked to this is an understanding that it is preferable to avoid or reduce those environmental costs in the first place. From these processes the concept of 'sustainable development' has emerged.

There is no single accepted definition of sustainable development, although the phrase has come to mean, 'development that meets present needs without compromising the ability of future generations to meet their needs.' (WCED, 1987 and Janic, 2006: 81).

This broad statement has been refined into three elements:

1. The rates of use of renewable resources should not exceed their rates of regeneration
2. The rate of use of non-renewable resources should not exceed the rates of development of their substitutes
3. The rate of pollution emission should not exceed the capacity of the environment to absorb it. (Daly, 1991)

When taken together, this does not mean that development is not possible. What emerge are the concepts that if economic growth is to be facilitated, it should be achieved in such a manner as to preserve the integrity of the underlying systems.

Included in this approach is the concept of intergenerational sustainability: namely that meeting current needs does not preclude future generations from meeting theirs.

Allied to this, Janic (2006) has noted that there are two approaches that could be applied to achieving a more sustainable transport system; the techno-positive and the techno-phobic. The techno-positive approach relies on increasing vehicle efficiency to reduce the environmental impacts of transport. This approach would permit the continued growth of transport by reducing the individual impact that each vehicle makes on the environment through mass efficiency gains. The techno-phobic approach seeks to mitigate the impact of transport through minimising or reversing transport growth.

This highlights one of the difficulties faced by policy-makers. As Banister *et al* note:

'One of the great challenges facing policy-makers at the start of the 21st century is to reconcile the different priorities between economic development and the environment, whilst at the same time recognising the different social priorities and distributional consequences of decisions.' (Banister *et al*, 2000: 1)

In his review of the current state of the concepts and theories behind sustainable transport, David Banister (2005) notes that there are three basic elements of sustainable development: economic, social and environmental development. Economic development refers to the growth of the economy over time, social development refers to the distribution of wealth between individuals and its spatial distribution and environmental development relates to the protection and enhancement of the natural environment without substantially depleting the stock of raw materials. Banister further notes that for sustainable development to be effective it requires willing stakeholder participation. With respect to the environment, all individuals, companies and governments are stakeholders, and the systems of governance are crucial to providing the necessary vision, resources and structural frameworks to facilitate action towards sustainable development (Banister, 2005: 8-9).

Banister identifies transport as a major contributor to carbon consumption and CO₂ emissions. He also notes that the car has become so embedded in the western way of life that it has reached the status of being an icon, albeit is an icon that gives the user many perceived benefits while imposing costs on others, either directly through pollution or indirectly through congestion and poorer access to some facilities (pp10-11). The motorcycle also has a degree of iconic status. The most commonly stated

reason for purchase of a motorcycle by non-London motorcyclists is 'the biker lifestyle' (ITS, 2004).

Banister identifies a link between car ownership and use and notes that, if present trends continue, congestion will increase as car ownership and use increases above the increase in road capacity. The first proposition he puts forward is that transport is unsustainable (p15), and the second is that sustainable urban development is dependent on cities being the centres of vitality, opportunity and wealth and that transport has a major role to play in cities (p17).

Banister notes that sustainable transport is an elusive goal and argues that:

'In an absolute sense all transport is unsustainable as it consumes resources. Walking and cycling come nearest to being sustainable, as they consume very little non-renewable energy, but even here other types of resources are used, principally space.' (Banister, 2005: 52)

In the urban environment resources are used for the construction and maintenance of cycling and walking spaces, although these often share the transport network that is the street.

This identifies the dilemma that is at the heart of the sustainable transport debate: transport is inherently unsustainable yet it is an essential component of everyday life. Transport modes generate trips of themselves. As Kerry Hamilton (2003) notes, 'If public transport is the answer, what is the question?' One of the crucial aims of working towards sustainable transport is to reduce the need to travel rather than merely to accommodate trips through alternate means. As Adams (1996) noted, the growth in private motorised transport is in large part attributable to new journeys that have been created and not by modal shift from other modes. Part of the solution, it is argued by Hamilton, Adams, Banister and others, is reducing the number of trips made.

Accommodating for growth

Most of the available literature on tackling transport problems concentrates on the motor car and road traffic in general. In a series of scenarios aimed at understanding the possible future directions society, and therefore travel patterns, could take, Lyons *et al* (2002) essentially present two visions of the future. The first is centred around a community oriented society, with high levels of government intervention and a far greater use of 'teleworking'. This scenario is dependent on the adoption of shared societal values and is predicated on individuals engaging in far greater levels of asset sharing, for example living space and travel, than at present. The second is a continuation of current societal development patterns, with an increase in the individual orientation of society, the expansion of the free market and the continued reliance by companies on workers travelling to the workplace. Lyons *et al* argue that the latter vision is the more likely, and that, 'Transport policy should acknowledge that total travel is unlikely to decline but that its nature will change.' (2002: 26) They note that mass collective transport will only be effective at coping with regular travel patterns and in major urban centres and along major corridors, and that effort needs to be made to mitigate the effects of individual transport through measures such as car sharing and technological advances.

Reduction of car dependency

Another body of literature focuses on attempts to reduce dependency on the car. This is often written from an anti-car perspective and suggests solutions for creating car-free cities (Crawford, 2000), for methods to divorce the car (Alvord, 2000) and to reclaim the street (Engwicht, 1999). This section of the literature provides an insight into techniques that could be used to help reduce dependency on the car, but they nearly all seem to ignore any potential benefit that motorcycles could bring to the process.

The concept of street reclaiming, as expressed by David Engwicht (1999) is aimed at creating more people-friendly streets through a change in the priorities given to the uses of the street. Although Engwicht claims that his book is, 'not a witch-hunt against the car' (p13) it aims to offer solutions to reduce car use and car dependency. Other strands in this literature emphasise the opinion that if the

problems of transport congestion, social exclusion and pollution are to be addressed, then a societal change away from an individuated society to one in which individuals travel less is required (Hamilton, 2003: 59).

John Adams (1996) noted that predictions of traffic growth offered little hope to environmentalists who advocate policies to get people out of their cars and back onto public transport. He argued that travel growth shows that most journeys now made by car are new journeys that never were on public transport. When people acquire cars, activity patterns change. People begin going to places previously unreachable by public transport and travelling at times when public transport does not run. From the 1960s to the 1990s, albeit with a period of delay, as more people acquired cars, land use patterns were allowed to respond. Retailers began locating out of town and residential developments moved to the suburbs, with room for garages and off-street parking. He further argues that with these changes in land use patterns, more places to which the public could be expected to have access became more difficult to reach by foot, bicycle or bus. (p 9). As noted by Phil Goodwin (2006), this concept of development generating traffic is not new, but has been debated for many years. The conclusion is that transport generates traffic, rather than traffic facilitation transport.

Mayer Hillman (2004) notes that the assumption that the most efficient, in terms of fossil fuel saving, method of minimising the effects of travel is to transfer journeys from private to public transport is flawed, given that fuel consumption by public transport is only 20% lower per passenger kilometre than by car and that the fuel-efficiency of cars is increasing (p35). In London, this may not necessarily hold true given the increasing levels of bus occupancy (TfL, 2005a). The assumption that greenhouse gas emissions can be lowered through more fuel efficient cars may be flawed, given that it could lead to increased energy demand: with increasing fuel efficiency it is possible to purchase vehicles with larger engines and greater performance without increasing running costs. Hillman also argues that speed is a significant element relating to fuel consumption as higher speeds require more fuel and also promote and facilitate longer journeys (p35). In the congestion charging zone in central London, average traffic speeds have increased (TfL, 2004c), but the effect this has had on fuel consumption is uncertain. The increase in speeds is largely attributable to vehicles spending less time stationary rather than faster speeds while travelling (LMWG, 2004). The correlation between speed and fuel

efficiency is not, however, linear. The optimal speed for fuel efficiency is 50kph (RUA, 2005: 23)

Phil Goodwin (2004) took as his starting point the notion drawn from earlier research which demonstrated that because that the number of cars required to transport a given number of people was more than the number of buses, then a transfer from car to bus would enable traffic to go faster. However, as Goodwin notes, that supposition contains a practical flaw:

‘For each individual, it is nearly always faster to travel by car, and there is normally little or no incentive to do otherwise. It is one of those cases where Adam Smith’s individuals pursuing their own best interests do not add up to Jeremy Bentham’s greatest good for the greatest number.’ (p8)

Goodwin notes that one technique that could be used to relieve congestion is road charging, making drivers pay for the perceived free good that is the road. However, such charging, he argues, is unlikely to be popular without particular attention to the use of the revenue streams thus generated (p8). Even when the revenue streams are hypothecated to public transport and environmental improvements, as they were with the London congestion charge, road pricing – especially when it is in addition to other motoring costs – is unlikely to be universally popular. In London, the charge was introduced as part of a manifesto commitment in a city where the majority of journeys are by modes other than the private car.

Leon Mannings (2006) has argued that congestion charging was introduced as a revenue-raising measure to fund other politically expedient measures. He also notes that, through the control and management of the network, an element of London’s congestion is manufactured.

Goodwin notes that responses to changes in travelling conditions, for example the reallocation of traffic lanes (with bus or other priority vehicle lanes) or whole streets (for example through pedestrianisation) are composed of two different processes. The first are the responses of specific individuals, limited by habits, a willingness (or not) to experiment, lack of awareness of alternatives, personal choice and by restrictive (but not necessarily permanent) domestic and economic circumstances. He argues that these individuals may make swift, small adjustments to their travel patterns, but that bigger changes occur at the same pace as their personal lives evolve through changing circumstances, attitudes and taste. The second set of

processes occurs with new entrants to the transport system, who respond to the situation they are presented with rather than having had to adapt from a previous set of experiences. Thus, Goodwin argues, the process of adaptation to new policies begins on day one, but takes between five and ten years to complete (Goodwin, 2004: 13).

Biking lifestyle

Another body of literature concentrates on the sociological and psychological aspects of motorcycling. These include studies of the so-called 'biker lifestyle', such as Harris (1985), or an examination of the association between some motorcycle clubs and criminal activity (Quinn and Shane Koch, 2003). While these studies provide an interesting analysis of the reasons why some individuals acquire and use motorcycles, and the formation of social communities among motorcyclists, they do little to provide an understanding of the place motorcycles take in the transport environment or the role they can take in a sustainable transport environment. Part of this literature has been studies on the evolution of riders' rights organizations, which are now dedicated to promoting the political interests of motorcyclists as opposed to the more social interests represented by motorcycle clubs and the interests of motorcycle sport (McDonald-Walker, 2000). McDonald-Walker notes that the first riders' rights organization (The Federation of National and One-Make Clubs, now the British Motorcyclists' Federation) was originally established to counter the poor media and public perception of motorcyclists, rather than to fight legislation. In the intervening years, both the BMF and its sister organization the Motorcycle Action Group, which was formed specifically to oppose the 1973 Helmet Law, have engaged in the political process as well as being enablers of social interaction (McDonald-Walker, 2000). More recently, she notes that the riders' rights organizations have succeeded in achieving wide-ranging political and policy impacts, not just at local and national levels, but also in Europe (McDonald-Walker, 2003).

Definitions

In order to facilitate the later analysis, benchmarking of the terms of reference in this thesis is useful. None of the three terms in the thesis title have single, clear definitions: however, the following are those that will be used.

Sustainable Transport

Although the term 'sustainable development' is part of our common language, it is difficult to define. The Bruntland report noted that, 'A sustainable condition for this planet is one in which there is a stability for both social and physical systems, achieved through meeting the needs of the present without compromising the ability of future generations to meet their own needs.' (WCED, 1987: 43)

The government's Transport White Paper (DETR, 1998) noted that, from a political point of view:

'A modern transport system is vital to our country's future. We need a transport system which supports our policies for more jobs and a strong economy, which helps increase prosperity and tackles social exclusion. We also need a transport system which doesn't damage our health and provides a better quality of life now – for everyone – without passing onto future generations a poorer world. This is what we mean by sustainable transport and why we need a New Deal.' (DETR, 1998: 16)

The National Motorcycle Strategy notes that:

'The theme of this strategy therefore is **to facilitate motorcycling as a choice of travel within a safe and sustainable transport framework.**'
(DfT, 2005a: 7. Emphasis in original)

A useful definition of sustainable transport comes from the Canadian Centre for Sustainable Transportation:

'A sustainable transportation system is one that:

- ‘Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations.
- ‘Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy.
- ‘Limits emissions and waste within the planet’s ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.’ (CST, undated).

The working model of sustainable transport that will be used in this thesis is based on this definition, and is considered to be one that:

Allows for the efficient working of an economy that allows all to participate in the daily life of London while minimising the damage the transport system causes to the human and natural environment, both globally and locally.

London

The term London is taken as referring to the geographic area covered by the Greater London Authority.

In terms of transport planning, London represents a unique case in England, insofar as there is a two-tier approach, with 34 planning authorities, and 35 Highways Authorities operating within its geographic limit. The Greater London Authority is responsible for strategic transport planning through the Mayor’s Transport Strategy (MTS) (GLA, 2001b). It is also responsible, as a Highway Authority (through Transport for London) for the maintenance and implementation of the MTS on the 550km of roads that make up the Transport for London Road Network. The 33 London Boroughs are responsible for the implementation of the MTS in their geographic area and the maintenance of highways, as a Highway Authority, of the Borough roads. The Highways Agency also has responsibility for those sections of motorway within Greater London, although a discussion of these is excluded from the scope of the thesis.

With a few exceptions, such as the elevated section of the A40 (Westway), roads in London are not grade separated. As such they have to fulfil a multiplicity of functions. In Islington, for example, the draft Sustainable Transport Strategy notes that approximately one third of the land area of the borough is dedicated for transport purposes. An examination of the associated map indicates that the entirety of the roads is defined as having a transport use (Islington, 2005: 28-29). This does not fully recognise the uses to which streets are put. As well as transport corridors, for all surface modes, the urban street fulfils a number of functions. It represents a significant open space; it can provide opportunities for leisure activity such as walking, cycling and driving; it gives access to retail, employment and other commercial opportunities; it gives access to people's homes. The street can also be an arena for social interaction. The café culture has also seen a resurgence of the street as an area for dining, and in some areas, the street is used as a play area for children. In short, the public highway represents the common area of civic society that privatised space never can.

Motorcycle

Motorcycles and mopeds come in many styles and sizes. For the purpose of this thesis the term motorcycle will be taken for what it is commonly accepted to be, and also includes mopeds and scooters. For a more detailed description of types of motorcycle, see Appendix A. In addition to this straightforward definition, there are a number of other definitions, and acronyms, used in policy documents for what is a motorcycle. The most common is PTW – Powered Two Wheeler (occasionally rendered as P2W). Other acronyms include TWMV – Two Wheeled Motor Vehicle and MPTWV – Mechanically Propelled Two Wheeled Vehicle. Where terms other than motorcycle are used in this thesis, it is in the context of the original document. These acronyms, while technically accurate, are not that useful to describe the characteristics of motorcycles and the needs of motorcyclists. Another term that is used is 'single track vehicle' to distinguish motorcycles from 'twin track vehicles.'

It is useful, in transport planning and engineering terms, to consider what a motorcycle is not. According to Tony Sharp of the Institute of Highway Incorporated Engineers, 'A motorcycle is not a fast bicycle and it is not a two-wheeled car.' (Sharp, 2005) This definition highlights the way that motorcycles have traditionally been treated. In some respects (road safety, vehicle movements, emissions, and

fiscal measures) they are treated in a similar category as motor cars. In other respects (occupancy of road space, some aspects of road safety and parking requirements) they are treated in a similar way to bicycles. The reality is that motorcycles are neither, and the requirements of motorcyclists are different from both cyclists and car drivers.

Methodology

Because of a lack of available literature directly relating to motorcycles and sustainable transport, this thesis relies heavily on secondary or grey data. The examination of such data is difficult, as much of it is produced with a policy aim in mind. It also generates much qualitative, rather than quantitative, data. The examination of these data sources therefore needs to be rigorous.

Quantitative data were also obtained from government produced statistics, both national and regional. These are again secondary data, and need to be treated with the same scepticism as government documents.

The thesis also relies on information obtained from motorcycling stakeholders, including Transport for London and Department for Transport officials, and three user groups, the Motorcycle Action Group, the British Motorcyclists Federation and the Motorcycle Industry Association.

In addition to an analysis of literature and policy, this thesis uses the results of two internet-based surveys of motorcyclists. The first, which is included as Appendix B, was conducted during August and September 2006 and was specifically designed for this thesis. It was publicised through a number of motorcycle-related internet forums and attracted 345 replies. The second, reproduced as Appendix C, was conducted in relation to a consultation exercise conducted by the City of Westminster into motorcycle parking in the Soho/West End Area. The survey ran during February and March, was publicised in a similar way to the first survey and attracted 249 replies. The results of the second survey were first published as MAG (2006a), and are reproduced with permission.

In addition to quantitative data, these surveys produced a significant amount of qualitative data through the comments sections at the end.

The technique of only using internet surveys carries a number of inherent flaws. There is no opportunity to ensure that a representative population sample is chosen, especially as the surveys were anonymous and only available to individuals with internet access and enough of an interest in motorcycling to frequent the forums chosen. One user group that is missing from the first survey is anyone with a motorcycle with an engine size less than 125cc. The results cannot therefore be considered statistically reliable, but they can be considered indicative of general trends.

A more comprehensive dataset could have been obtained through face-to-face interviews either at locations where motorcyclists and scooter riders gather, or at motorcycle parking locations, or both. If the exercise were to be repeated, then, subject to available resources, a more comprehensive survey would be undertaken.

Summary

What emerges from the literature is that there is no single clear definition of what constitutes a sustainable transport mode, a sustainable transport system or a sustainable transport strategy. The general conclusion is that the current direction of traffic growth is clearly unsustainable, in economic, environmental and social terms.

There is no one sustainable transport mode, and each of the available modes needs to be used where it is most appropriate. Some writers claim that all motorised transport is an unsustainable mode, while ignoring its benefit for some longer trips.

A sustainable transport system is one which:

- Enables the economy to continue to function (economic sustainability)
- Does not reduce natural resources (environmental sustainability)
- Does not take resources from future generations (social sustainability)

A sustainable transport strategy is one which helps achieve a sustainable transport system while fulfilling the necessary purpose of a transport system and remains functional.

Part Two

Transport

Transport is an essential part of our way of life. In the nineteenth century the inventiveness of Victorian engineers brought first the railway and then the internal combustion engine. The shift from 'foot cities' to 'tracked cities' enabled cities to grow, both physically and economically. The mass transportation which facilitated this growth also became integral to the daily life of the city (Docherty, 2003). It permitted the growth of the suburb and allowed for the separation of land uses. People no longer had to live within walking distance of where they worked. Travel was no longer a luxury; it was a necessity for the daily functioning of the city.

Cathy McKenzie argues that transport technology was also an essential element of the modernist project. She further notes that,

'Although in recent years the most marked achievements in further intensification and compression of time and space has been brought by new communications technologies, transport is still an essential component of the phenomenon of globalisation.' (McKenzie, 2003: 18)

However, despite advances in telecommunications, and the opportunities to reduce the need for physical travel they offer, a transport system is still required for the efficient functioning of society. In recent years, greater attention has been placed on how to mitigate the environmental damage that transport causes, while maintaining a transport system that has a good degree of functionality.

The most profound impact on transport in the twentieth century was the invention, albeit in the late nineteenth century, and growth in use of the motor vehicle.

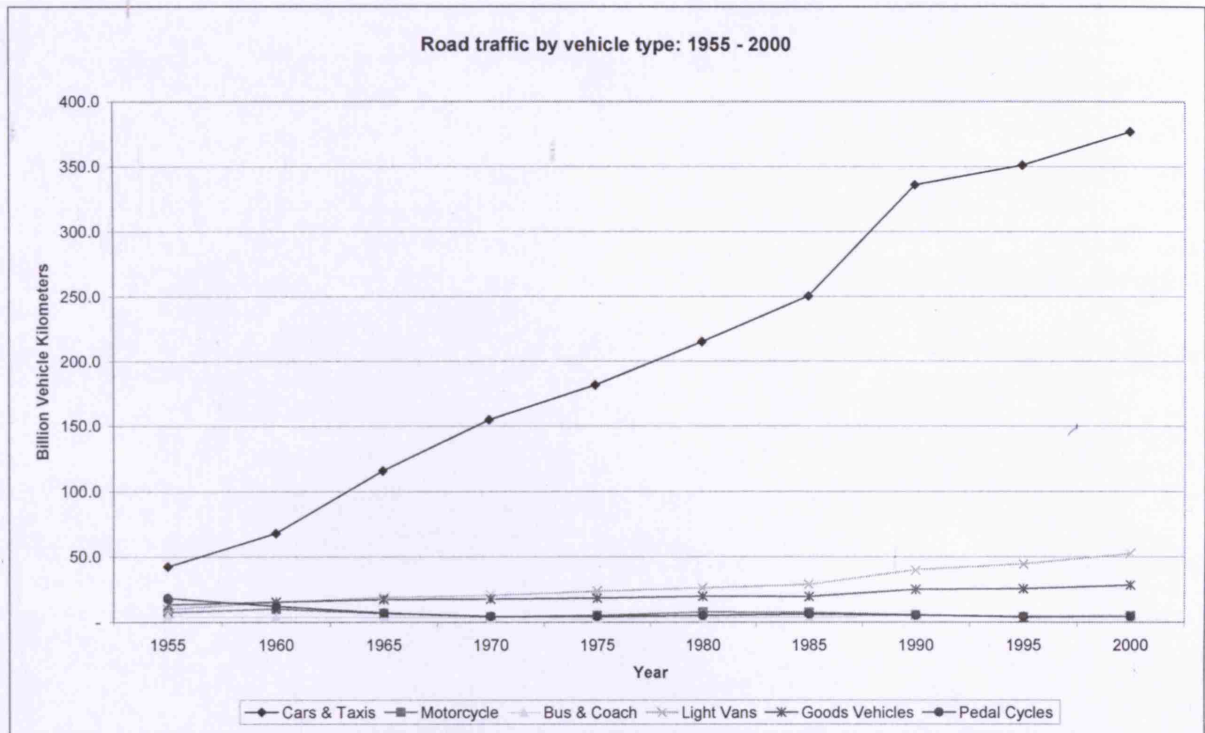


Figure 1: Road traffic by vehicle type, 1955-2000

Source: DfT (2004b)

The above chart demonstrates the growth of vehicle traffic since 1951. It can be seen that the majority of passenger kilometres travelled has, in the period covered, been by car. Currently, over 90% of all road distance travelled is by car, van or goods vehicle, with the remaining modes – bus, bicycle and motorcycle – being used for less than 10% of travel.

There have been many attempts to understand the causes of the phenomenal growth in car ownership and use. Colin Buchanan, writing in a report prepared for the Ministry of Transport in 1963, argued that the growth of car use, and the associated problems faced by transport planners:

‘Arises directly out of man’s own ingenuity and growing affluence – his invention of a go-anywhere self-powered machine for transport and personal locomotion and his growing ability and inclination to invest in it.’ (Ministry of Transport, 1963: 7)

As the quote from the Buchanan report so presciently noted, the car is a useful machine that has become increasingly available, and is a possession that is aspired to. David Banister, like many other writers, describes the car as an ‘icon’ (Banister,

2005: 10). In addition to being an icon and a mode of transport, the automotive sector represents a significant contributor to the UK economy.

The growth in road traffic since the war has prompted a number of debates on how to cope with the effects of road traffic. In his report Buchanan argued that cities should be redesigned to accommodate for the growth in cars. However, he also noted that, without other mitigating factors being taken into account:

‘Either the utility of vehicles in towns will decline rapidly, or the pleasantness and surroundings will deteriorate catastrophically – in all probability both will happen together.’ (Ministry of Transport, 1963: 7)

This latter comment is perhaps in accord with the approach taken by the Dutch environmentalist J. H. Crawford, who argues that ‘The automobile is the most extreme example of a useful technology that has been inappropriately applied’ (Crawford, 2000: 18) and calls for a reconstruction of the urban form to achieve, wherever possible, car-free cities on a more human scale. As noted earlier, transport was essential for the growth of cities. London could not have achieved the growth it did without good transportation links: the daily reality for most working Londoners is a requirement to travel, be it using public or private transport.

The growth in the use of motor cars in the past 40 years has been phenomenal, so much so that many parts of the road network regularly come to an almost complete standstill on a regular basis. As noted in the 1998 White Paper (DETR, 1998), the ‘old’ policy of ‘predict and provide’ had been largely discredited and the new approach is to try and curb traffic growth, rather than try to accommodate it.

Notwithstanding the ultimate goal of reducing car use, the car is still seen as being a useful tool in many parts of the country, especially for journeys that would be impractical or even impossible by public transport. Although the MTS aims to reduce car dependency, the car is still recognised as a useful and legitimate transport mode, especially in outer London where public transport is less available (GLA, 2001b: 100).

However, the motor car cannot be un-invented. As Buchanan noted:

‘It seems futile to deny these things [the usefulness of the motor car]. The motor vehicle is a remarkable invention, so desirable that it has wound itself inextricably into a large part of our affairs.’

Although that paragraph of the report finishes, 'There cannot be any going back on it' (Ministry of Transport, 1963: 38), the policy emphasis is now to mitigate the effects of car use.

Traffic growth is often described as if it were an iterative process: new entrants adding to an existing stock. The reality is that growth is made of two elements: as well as new entrants acquiring and using vehicles, there will be some who, for whatever reason, dispose of a vehicle and do not replace it. According to Phil Goodwin, a steady growth of 2% in car traffic means that 12% of households increase their cars, and 10% reduce them (Goodwin, 2004: 13). The same phenomenon could be said to apply to motorcycles, although the rate of turnover of the fleet is higher because of the greater level of growth.

The Historic Use of Motorcycles

Motorcycle use has always been a minority transport activity, not just in terms of crude numbers of vehicles registered, but also in terms of use. On average, each motorcycle covers approximately half the distance of a car (DfT, 2006a). Therefore, although an examination of numbers of vehicles of each class registered does not necessarily reflect their use, it is an indicative measure.

Writers who have chronicled the use of motorcycles in the post world war two period have tended to concentrate on the 'lifestyle' aspect more than their contribution to the transport mix. As Maz Harris noted:

'The arrival of the motorcycle as a means of transport materially accessible to the mass of working class youth – in America during the mid-1940s and a decade later in Europe – meant, for the first time, that the horizons of leisure activity were extended beyond the confines of the local high-street café or dance hall. Over and above this new-found freedom of mobility, the motorcycle offered a "magical release" from the prison of work-a-day life. To ride a motorcycle meant much more than driving the family saloon – it was exciting, it was noisy, it was brash and, what's more, it got up the nose of authority.' (Harris, 1985: 22)

Although the late Dr Harris paints a somewhat hackneyed picture of motorcycle use, this approach does, however, reinforce the stereotype that many planners and members of the general public have about motorcycles and motorcyclists – that they

are noisy, dirty and smelly and associated with anti-social behaviour (LCC, 2004 and Islington, 2005). The generally accepted view is that the motorcycle, in the 1950s and 1960s, at least, was a temporary transport choice; a cheap alternative for personal transport, with many riders aspiring to, and achieving, car ownership as and when it could be afforded (McDonald-Walker, 2000).

Maz Harris does, however, note that for some, the motorcycle or scooter was a lifestyle choice rather than just being a transport choice. In his critique of the 'Mods and Rockers' era of 1964-1966 he notes that, 'The mod phenomenon was no more than a phase, a fashion, a hype which was totally incapable of sustaining its initial impetus and cohesion.' He also asked the rhetorical question: 'How many scooters do you see on the roads today?' (Harris: 1985: 114). Although the answer then was, 'very few', numbers of scooters have increased dramatically in recent years (MCIA, 2004).

In 1955 motorcycles accounted for less than 20% of the total number of vehicles in circulation in the UK (DfT, 2004b) and approximately 10% of the distance travelled (DfT, 2005a). By 2000, motorcycles accounted for about 2.5% of the licensed vehicle stock (DfT, 2004c), and 1% of the distance travelled (DfT, 2005a). This is consistent with the motor trade's assumption that an average car driver will cover 10,000 miles a year, whereas motorcycles will cover between 4,000 and 5,000 (Carey-Clinch: 2005 and DfT, 2006a).

The historic levels of motorcycle registrations are shown in figure 2 below.

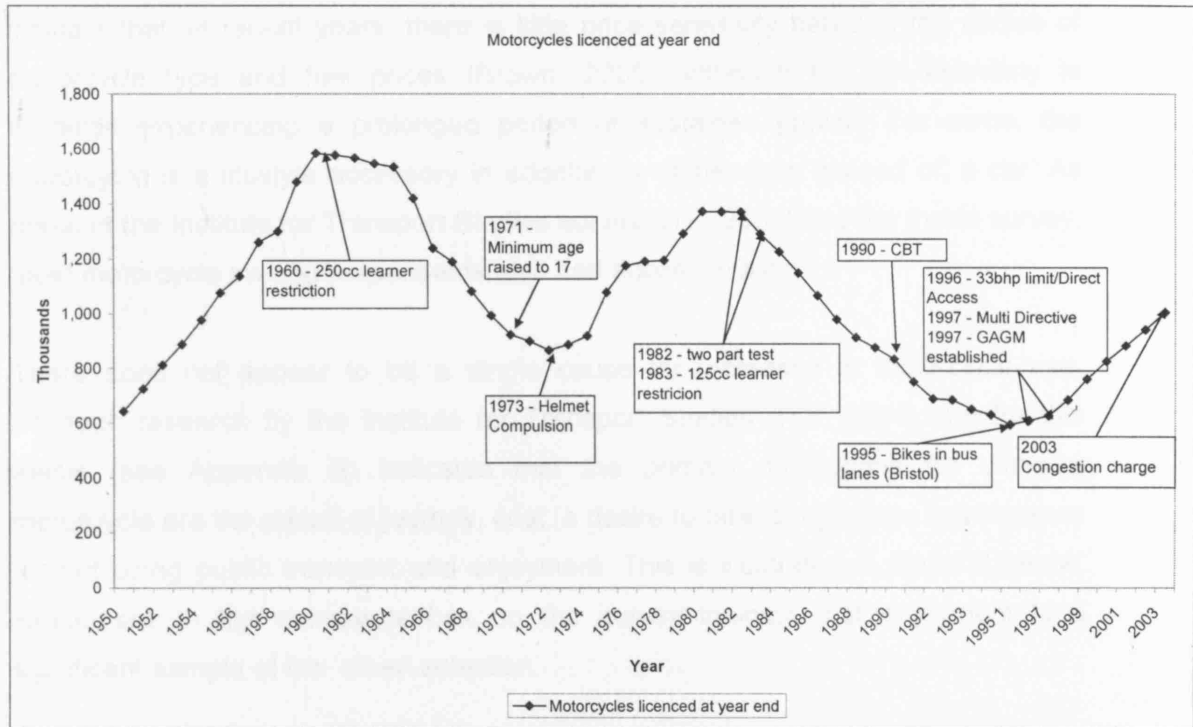


Figure 2: Motorcycles licenced at year end, 1951-2004

Source: DfT, 2004b, DfT, 2005b

As can be seen from figure 2, the numbers of motorcycles licensed at year end have followed a cyclical pattern since 1951. The chart has been annotated with some of the key events that are thought to have prompted a change in motorcycle usage. A casual analysis would suggest that growth in motorcycle use is reversed by measures which restrict access to motorcycles, and the subsequent decline is reversed in times of economic slowdown. The first turning point came in 1960, when learner riders were restricted to a 250cc solo machine, having previously been able to ride any size of motorcycle. Increasing affluence in the 1960's, changes in the purchase tax regime and lifestyle aspirational changes led to an increase in desire for motorcars rather than motorcycles or scooters, despite the minority popularity of two wheeled transport among the mods and rockers.

The raising of the minimum age for riding a motorcycle from 16 to 17 in 1971 had little effect on the decline in popularity of motorcycles. This decline was reversed in 1973, a year that saw the first drop in the number of car registrations since the Second World War. This can be attributed to the massive increase in fuel prices caused by the first oil shock, and the growth in motorcycle use could be seen as a response to the oil crisis and subsequent recession. Analysis of new motorcycle registrations carried out by Nich Brown of the Motorcycle Industry Association

indicate that, in recent years, there is little price sensitivity between the choice of motorcycle type and fuel prices (Brown, 2006), although the UK economy is currently experiencing a prolonged period of sustained growth. For some, the motorcycle is a lifestyle accessory in addition to, rather than instead of, a car. As noted in the Institute for Transport Studies survey (ITS, 2004) and the thesis survey, most motorcycle owning respondents also had access to a car.

There does not appear to be a single cause for increases in motorcycle use, although research by the Institute for Transport Studies (ITS, 2004) and for this thesis (see Appendix B) indicates that the primary motivations for using a motorcycle are the speed of journey, cost, a desire to beat congestion, a preference for not using public transport and enjoyment. This is illustrated in figure 3 below. Responses in the comments box on the survey indicate that enjoyment is a significant sample of the 'other' selection.

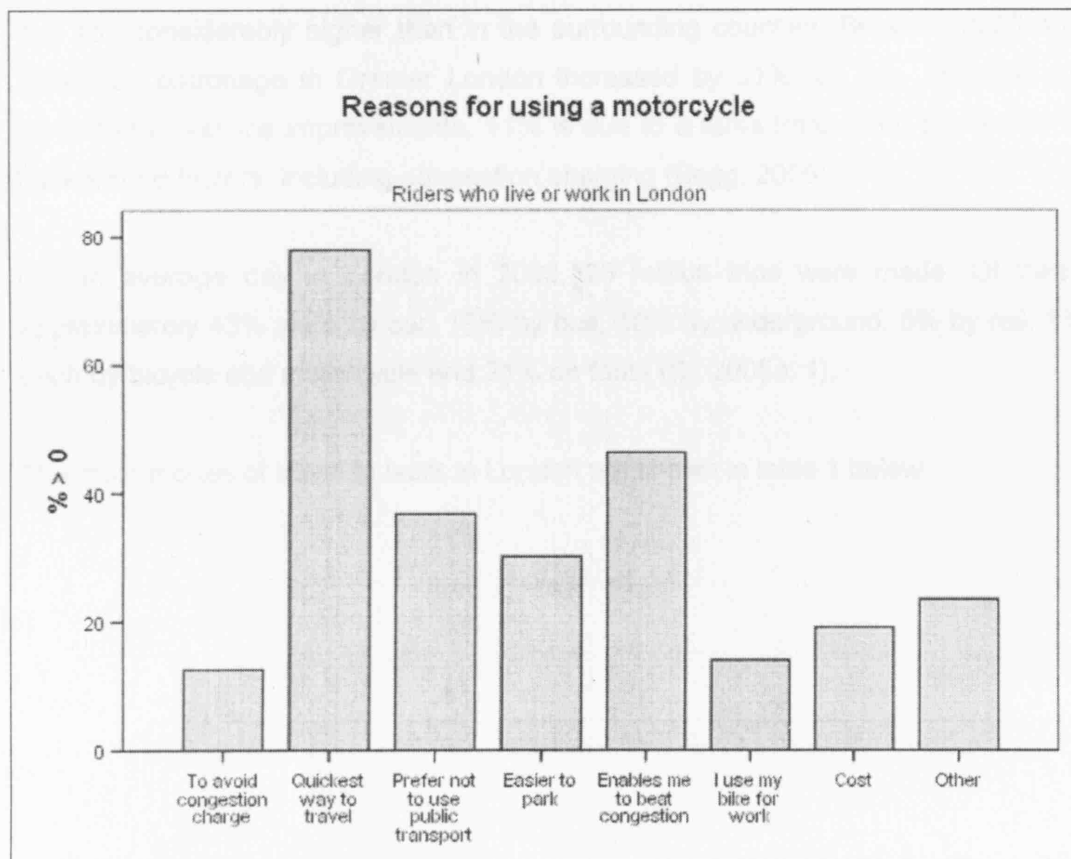


Figure 3: Reasons for using a motorcycle

From a low point in 1973, motorcycle registrations continued to increase until 1983 when learner riders were further restricted to power-limited 125cc motorcycles. As with the introduction of the 250cc limit in 1960, safety was given as the prime motivation this change. No such similar restrictions have been placed on learner or novice car drivers, other than the requirement for the accompanying driver to be over the age of 21 and to have held a full driving licence for three years.

Transport in London

Unlike other parts of the UK, the majority of trips in London are by means other than the car (TfL, 2005a). This is in part a reflection of the greater levels of public transport provision, and also of lower levels of car ownership. Professor David Begg, then of the Commission for Integrated Transport has noted that while bus provision in some of the more outlying areas of Greater London is less than in central London, it is still considerably higher than in the surrounding counties. Between 2000 and 2004 bus patronage in Greater London increased by 31%. Of this, 15% can be attributed to service improvements, 11% is due to a fares freeze and 5% is due to background factors, including congestion charging (Begg, 2005).

On an average day in London in 2003, 26 million trips were made. Of these approximately 43% were by car, 18% by bus, 10% by underground, 5% by rail, 1% each by bicycle and motorcycle and 21% on foot (TfL, 2005a: 1).

The main modes of travel to work in London are shown in table 1 below.

Main mode	Area of workplace						Percent
	Central	Rest of	Outer	All	Rest of	Great	
	London	inner	London	London	Great	Britain	
Car and Van	12	36	66	42	76	71	
PTW	2	2	1	2	1	1	
Bicycle	3	4	2	2	3	3	
Bus and Coach	10	17	13	13	7	8	
National Rail	38	12	4	17	2	4	
Underground &c.	28	17	4	15	-	2	
Walk	5	11	10	9	11	10	
All Modes	100	100	100	100	100	100	

Table 1: Main mode of travel to work

Source: TfL, 2005a: 10

Although in outer London car travel accounts for the majority of trips to work, this compares favourably with the rest of the country – with those trips which would otherwise have been made by car being made by public transport.

Travel times to work also vary across London and by mode, with the longest journeys being made to central London by national rail and the shortest in outer London on foot. These travel times are shown in table 2 below. Journey times to central, inner and outer London are greater than in other parts of the country for all modes.

Main mode	Area of workplace						Minutes
	Central	Rest of	Outer	All	Rest of	Great	
	London	inner	London	London	Great	Britain	
Car and Van	54	37	32	35	23	24	
PTW	37	32	22	32	21	23	
Bicycle	28	23	19	24	16	16	
Bus and Coach	47	40	37	41	33	34	
National Rail	71	71	67	71	55	65	
Underground &c.	50	52	49	50	42	49	
Walk	20	16	13	16	12	13	
All Modes	56	42	32	42	23	25	

Table 2: Travel times to work

Source: TfL, 2005a: 10

What these data do not demonstrate is comparative speeds of specific journeys across modes. Modal choice depends on a number of factors, including price, reliability, convenience and personal preference. Informal experiments conducted by the Motorcycle Industry Association indicate that motorcycles journey times in central and inner London are 40-60% faster than the equivalent car journey (MCIA, 2001), indicating that motorcycles are used for similar journey types to cars.

Congestion Charging

The congestion charge is possibly the most important transport scheme introduced in London. A discussion of the theories behind the congestion charge is beyond the scope of this thesis, although Leon Mannings (2006) has argued that the implementation of the scheme was a political expediency designed to raise the necessary revenue to fund other transport improvements rather than a policy designed to reduce congestion. What will be examined is the effect of the congestion charge, how it has changed motorcycling and the impacts that can have on the process of sustainable transport in London.

In the draft Mayor's Transport Strategy (MTS) (GLA, 2001a), it was proposed that motorcycles be exempt from the charge, rather than qualifying for a 100% discount.

This is a critical difference, as a discount can be more easily altered than transferring an exempt class of vehicle into the charging scheme, which would require a new Traffic Management Order.

As Banister (2005) notes, if the charge were to be based on the level of congestion caused, then motorcycles should not be required to pay, but if it were to reflect the levels of emissions produced then they should be required to pay. In representations to the draft MTS it was argued by the Motorcycle Action Group that motorcycles should be exempt from the charge as they cause less congestion than bicycles (Iline & Carey-Clinch, 2001). One argument that was put forward was that in a narrow traffic lane it is possible for a slow-moving bicycle to delay a line of traffic, whereas a motorcycle, which occupies a similar amount of roadspace, is able to move at the prevalent speed of the traffic flow. This was noted by the Greater London Authority, as were objections to the exemption from, 'A couple of environmental groups' (MORI, 2001: 19). However, it was also put forward by the GLA that:

'It would be difficult to capture the vehicle registration numbers of motorcycles and mopeds using the cameras, therefore this category remains "exempt" from the proposed £5 charge' (MORI, 2001: 19).

It is unclear from the available literature whether motorcycles enjoy this exemption because they aid in reducing congestion or for the technical reasons of number plate recognition noted above.

One clear effect of the congestion charge, shown in figure 4 below, is a decrease in the number of potentially chargeable vehicles entering the zone, and an increase in the number of non-chargeable vehicles, including motorcycles, with concomitant changes in vehicle kilometres driven in the zone, shown in table 3 below.

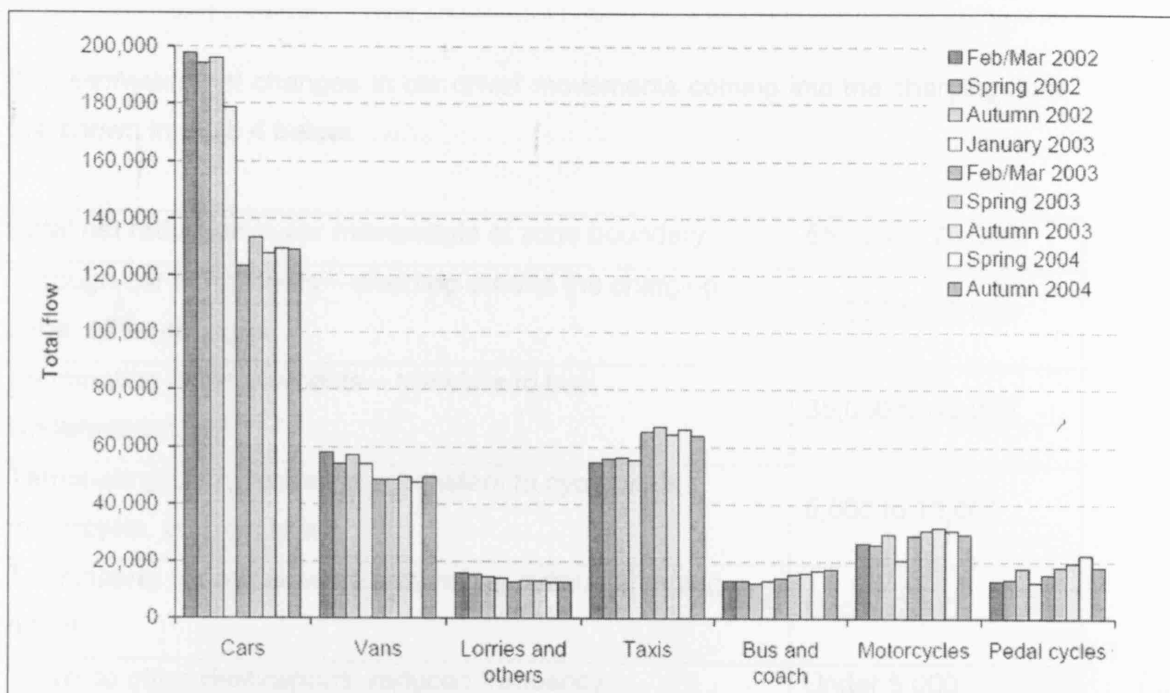


Figure 4: Traffic entering charging zone during charging hours

Source: TfL, 2005a: 23

Vehicle type	2002 vkm (millions)		2003 vkm (millions)		2004 vkm (millions)		% change 02to03	% change 03to04
All vehicles	1.64	100%	1.45	100%	1.38	100%	-12%	-5%
Four or more wheels	1.44	88%	1.23	84%	1.16	84%	-15%	-6%
Potentially chargeable	1.13	69%	0.85	58%	0.80	58%	-25%	-6%
Cars	0.77	47%	0.51	35%	0.47	34%	-34%	-7%
Vans	0.29	18%	0.27	19%	0.26	19%	-5%	-4%
Lorries and other	0.07	4%	0.07	5%	0.06	5%	-7%	-8%
Licensed taxis	0.26	16%	0.31	21%	0.29	21%	+22%	-7%
Buses and coaches	0.05	3%	0.07	5%	0.07	5%	+21%	+5%
Powered two-wheelers	0.13	8%	0.14	9%	0.13	10%	+6%	-2%
Pedal cycles	0.07	4%	0.09	6%	0.09	7%	+28%	+4%

Table 3: Vehicle-kilometres driven within the charging zone during charging hours, including percentage share of traffic. Annualised weekday for 2002, 2003 and 2004.

Source: TfL, 2005a: 29

The estimated net changes in car driver movements coming into the charging zone are shown in table 4 below.

Total net reduction in car movements at zone boundary	65,000 to 70,000
Through car movements – diverting around the charging zone, other changes	15,000 to 20,000
Terminating car movements – transfers to bus, Underground, rail	35,000 to 40,000
Terminating car movements – transfers to cycle, walk, motorcycle, taxi, car share	5,000 to 10,000
Terminating car movements – travelling outside charging hours	Under 5,000
Travel to other destinations, reduced frequency	Under 5,000

Table 4: Net changes in car driver movements

Source: TfL, 2005a: 54

When these figures are compared to the numbers of motorcycles entering the charging zone, it is possible to adduce that approximately 10% of the net decrease in terminating car movements that has transferred to other modes has transferred to motorcycles.

In their draft Local Implementation Plan (WCC, 2006), Westminster City Council argued that the introduction of congestion charging in February 2003 had led to a large increase in the numbers of motorcycles entering the charging zone. This is contradicted by the evidence of motorcycle registrations in London (shown in figure 5 below), which demonstrates that motorcycle use in London has been increasing since 1994.

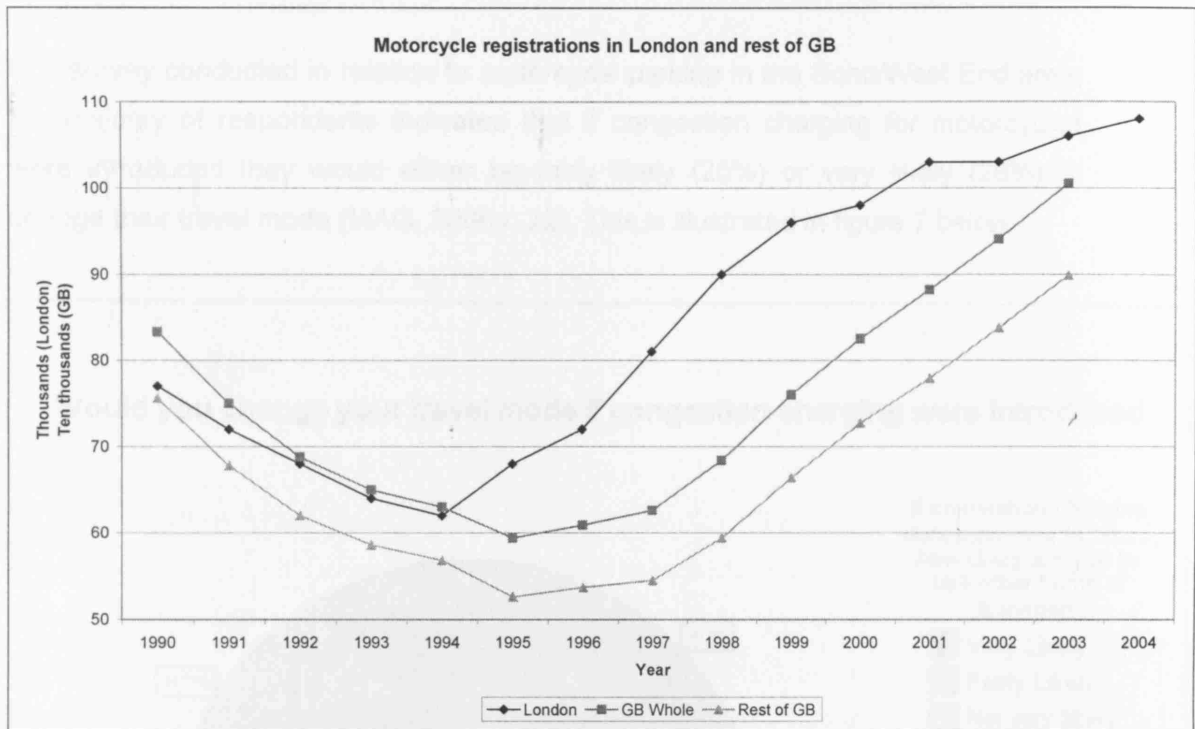


Figure 5: Motorcycle registration in London and rest of GB

Source: DfT, 2004b; DfT, 2005b; TfL, 2005a

According to TfL documents, there was a slight increase in the number of motorcycles entering the zone during the spring and summer of 2003, but those numbers have since fallen to a similar level to when the charge was introduced (TfL, 2006: 37). This is illustrated in figure 6 below.

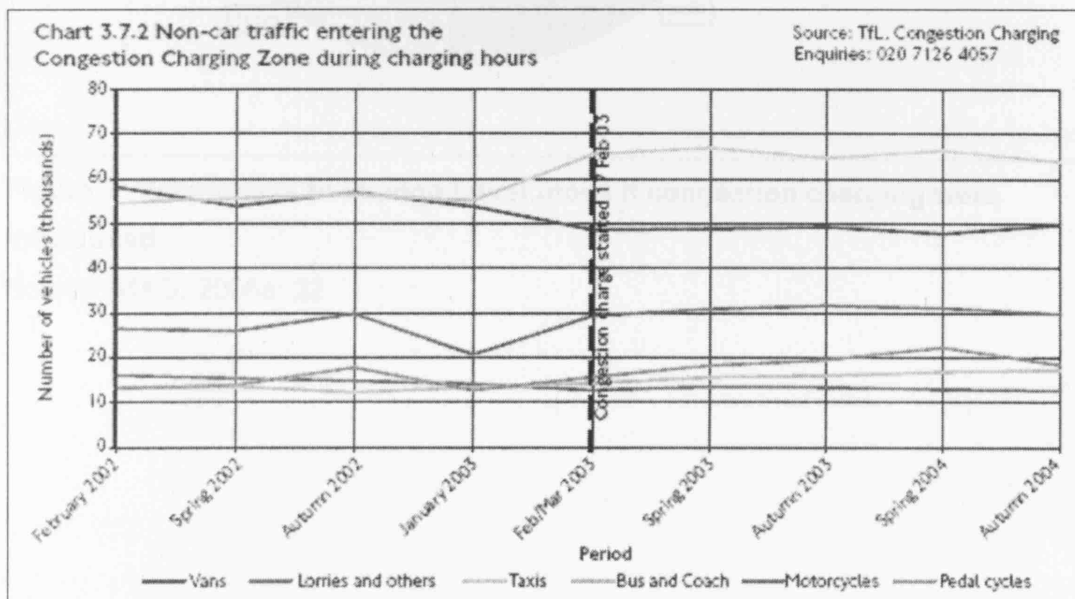


Figure 6: Non-car traffic entering congestion charging zone

Source: TfL, 2006: 37.

In a survey conducted in relation to motorcycle parking in the Soho/West End area, the majority of respondents indicated that if congestion charging for motorcycles were introduced they would either be fairly likely (25%) or very likely (26%) to change their travel mode (MAG, 2006a: 22). This is illustrated in figure 7 below.

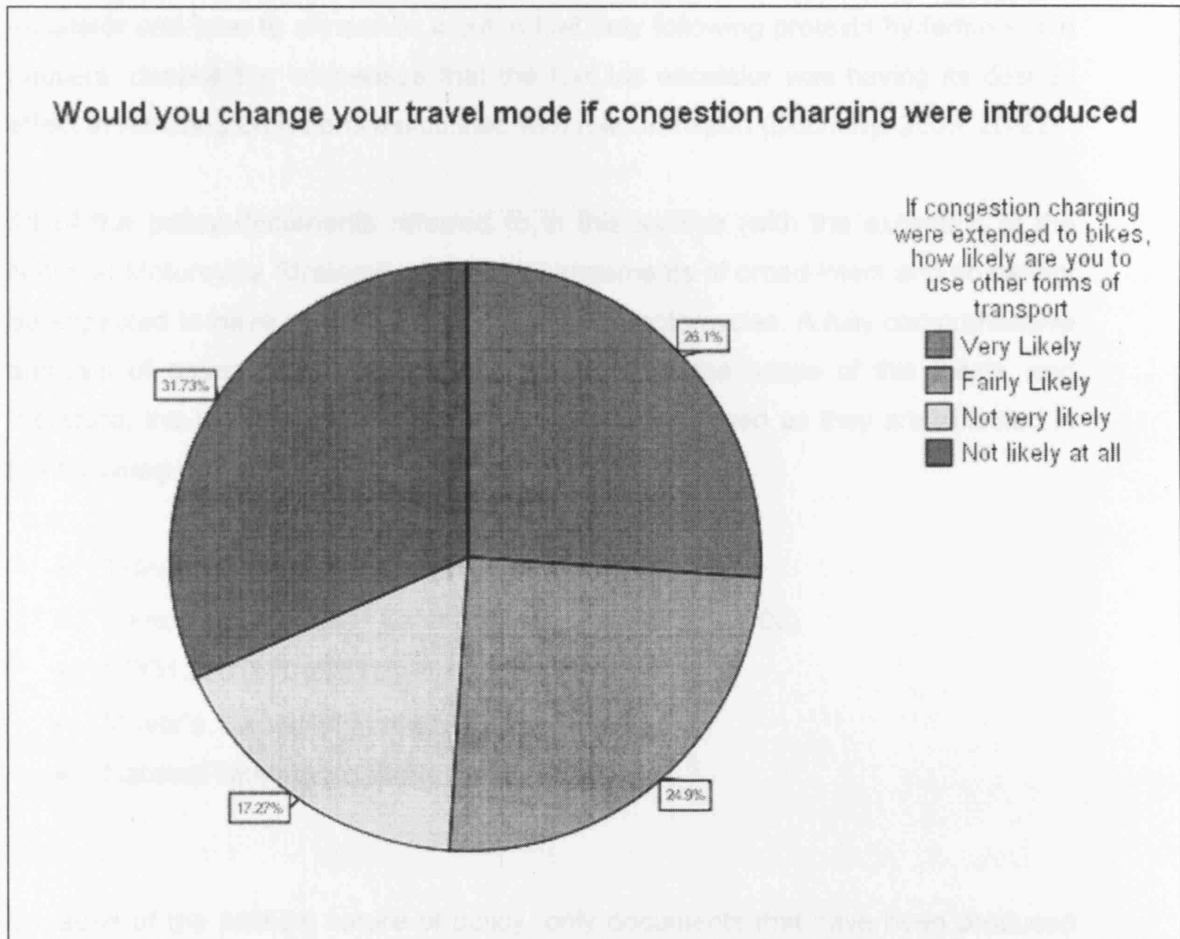


Figure 7: Willingness to change travel mode if congestion charging were introduced

Source: MAG, 2006a: 22

National Policy

Policy is, by its very nature, inherently political. It is influenced not just by the opinions of the politicians, but is also informed by lobby groups. The nature of this relationship is reflected in the decision in September 2000 to abandon the fuel tax escalator and later to announce a cut in fuel duty following protests by farmers and hauliers, despite the consensus that the fuel tax escalator was having its desired effect in reducing emissions associated with road transport (Docherty, 2003: 20-22).⁷

All of the policy documents referred to in this section (with the exception of the National Motorcycle Strategy) are general statements of broad intent and so cannot be expected to have too much detail relating to motorcycles. A fully comprehensive analysis of government transport policy is beyond the scope of this thesis, and therefore, the issues as noted above have been examined as they are reflected in the following national and regional documents:

- Transport White Paper (DETR, 1998)
- Tomorrow's Roads – Safer for Everyone (DETR, 2000)
- PPG13 (DTLR, 2001)
- Mayor's Transport Strategy (GLA, 2001b)
- National Motorcycle Strategy (DfT, 2005a)

Because of the political nature of policy, only documents that have been produced by the current government are considered. This is also because part of their 1997 election manifesto was a commitment to put motorcycling at the heart of transport policy.

The first major white paper, *A New Deal for Transport: Better for Everyone* (DETR, 1998), also represented a marked shift away from the old 'predict and provide' models for transport infrastructure that had been expressed in the previous administrations' White Paper, *Roads for Prosperity* (DoT, 1989). Ian Docherty notes that the conditions were ripe for a change in direction, given the lack of funds for new investment caused by the recession of the early 1990's and popular protests against road building schemes (Docherty, 2003: 10).

Policy with regard towards motorcycles was traditionally informed by 'common sense', 'intuition' and received opinion (McDonald-Walker, 2000). The popular image of motorcycles and motorcyclists in the 1980's was very much of the 'outlaw' biker as portrayed by Maz Harris (1985) and Ian Mutch (2005). According to Julian Jones (then employed by the Department of Transport), in the 1980's and early 1990's motorcycles were tacitly ignored by the then Department of Transport as their safety record was not good and it was hoped that if a position of not doing anything to either encourage or discourage motorcycle use were adopted, the decline in use would continue and the problem of motorcycle accidents would dwindle to a rump (Jones, 2003). However, motorcycle use increased from the mid-1990's and with it casualty numbers, although these have now started to decline. The image of motorcyclists, in some regards, appears to have survived (LCC, 2004), although motorcyclists now come from all walks of life (ITS, 2004 and MAG 2005a).

As has been shown above, the mid-1990s saw an increase in motorcycle use, which also coincided with the increasing politicisation of the Riders' Rights Organisations (McDonald-Walker, 2003), and their greater effectiveness in achieving recognition of motorcycling as a legitimate transport mode.

Integrated and Sustainable Transport

The 1998 White Paper noted that, 'We want transport to contribute to our quality of life not detract from it. The way forward is through an *integrated transport policy*'. (DETR, 1998: 8, emphasis added). As if to rebuff John Hibbs' observation that neither the White Paper nor its daughter documents defined 'integrated transport' (Hibbs, 2000: 11), the White Paper explains that by an integrated transport policy is meant:

- 'integration **within and between different types of transport** – so that each contributes its full potential and people can move easily between them;
- 'integration **with the environment** – so that our transport choices support a better environment;
- 'integration **with land use planning** – at national, regional and local level, so that transport and planning work together to support more sustainable travel choices and reduce the need to travel;

- 'integration with **our policies for education, health and wealth creation** – so that transport helps to make a fairer, more inclusive society.' (DETR, 1998: 8, emphases in original)

Perhaps the most significant contribution that was made towards integrated thinking with regard to transport and land-use planning was the merging of the former Departments of Transport and the Environment in an attempt to join up the policy areas of transport, land-use planning and regional government in the then Department of Transport, Local Government and the Regions (Vigar & Steed, 2003: 55). However, the new 'super department' proved too unwieldy and has since undergone re-organization. At the time of writing, transport is a department of its own, the environment is covered by the Department for Environment, Food and Rural Affairs, while land-use planning is part of the Department for Communities and Local Government.

The White Paper focused on a view of sustainable transport that supported economic growth while aiming to improve air quality and reduce social exclusion. (DETR, 1998: 16)

With respect to motorcycles the White Paper noted that:

'Mopeds and motorcycles can provide an alternative means of transport for many trips. Where public transport is limited and walking unrealistic, for example in rural areas, motorcycling can provide an affordable alternative to the car, bring benefits to the individual and widen their employment opportunities.' (DETR: 1998:41)

This represents the recognition of motorcycles as a viable transport mode, and recognises their potential for promoting social inclusion. This latter aspect is currently recognised through the Countryside Agency's 'Wheels to Work' programme (See, for example, CA, 2002).

The White Paper further notes:

'Whether there are benefits for the environment and for congestion from motorcycling depends on the purpose of the journey, the size of motorcycle used and the type of transport that the rider has switched from. Mopeds and small motorcycles may produce benefits if they substitute for car use but not if people switch from walking, cycling or public transport.' (DETR: 1998: 41)

This statement leaves an open question, as the relative environmental efficiencies of different motorcycles is dependent on a number of factors, as it is with cars and public transport.

What the White Paper does introduce is the notion of a transport hierarchy, with more sustainable modes, such as walking, cycling and public transport nearer the top, followed by transport for those with disabilities, then goods delivery vehicles with motorcycles and private cars at the bottom. An illustration of part of this hierarchy is shown below.

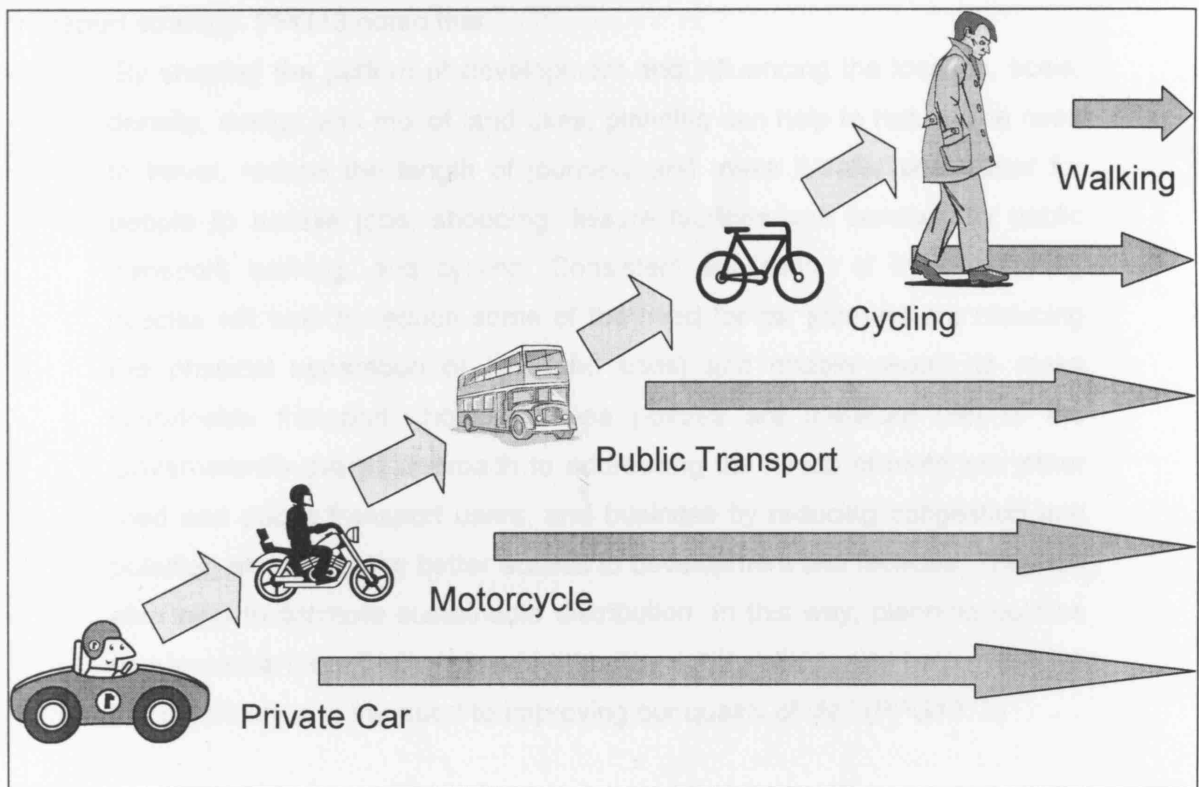


Figure 8: Transport hierarchy

Source: Adapted from MAG, 2005a

The arrows moving diagonally up the page indicate the desire of policy-makers to achieve modal shift in that direction, while the horizontal arrows recognise that, depending on the circumstances, all forms of transport are viable options.

One of the themes that runs through the White paper is a critique of the number of short trips that are made by car. According to the White Paper, nearly three-quarters of all trips are less than five miles, and 45% are less than two miles (DETR, 1998:

24). Currently, 56% of all car trips are under five miles (compared to 35% of all motorcycle trips), but with cars being used for about four-fifths of all trips between two and five miles (DfT, 2006a). To achieve more sustainable transport, therefore, a greater impact can be achieved by reducing the proportion of short trips that are made by less sustainable modes and moving them up the modal hierarchy.

Land-use planning

The revised Planning Policy Guidance Note 13 on transport (DTLR, 2001) established a link between land use planning and the delivery of an integrated transport strategy. PPG13 noted that:

‘By shaping the pattern of development and influencing the location, scale, density, design and mix of land uses, planning can help to reduce the need to travel, reduce the length of journeys and make it safer and easier for people to access jobs, shopping, leisure facilities and services by public transport, walking, and cycling. Consistent application of these planning policies will help to reduce some of the need for car journeys (by reducing the physical separation of key land uses) and enable people to make sustainable transport choices. These policies are therefore part of the Government’s overall approach to addressing the needs of motorists, other road and public transport users, and business by reducing congestion and pollution and achieving better access to development and facilities. They will also help to promote sustainable distribution. In this way, planning policies can increase the effectiveness of other transport policies and help maximise the contribution of transport to improving our quality of life.’ (PPG13: 2)

This approach was complimented by noting that:

‘Local authorities should seek to ensure that strategies in the development plan and the local transport plan are complementary: consideration of development plan allocations and local transport priorities and investment should be closely linked. Local authorities should also ensure that their strategies on parking, traffic and demand management are consistent with their overall strategy on planning and transport.’ (PPG13: 20)

In addition, the PPG suggests that, in preparing development plans local authorities should, ‘Use parking policies, alongside other planning and transport measures, to

promote sustainable transport choices and reduce reliance on the car for work and other journeys.' (PPG13: 3)

Social Inclusion

At the core of many modern urban policy initiatives are notions of 'social exclusion'. Paul Lawless has noted that, 'Social exclusion is widely perceived as a process, the end product of which is deprivation.' The process of social exclusion is highly dynamic, and the result can be manifested in many ways (Lawless, 1988: 238) Lawless further argues that, 'Social exclusion (...) needs to be seen within a wider interpretation of society which embraces not simply the excluded, but also the included.' (p239)

The issue of the spatial element to urban poverty is also a key factor in the social exclusion debate. As Pierre Rosanvallon notes,

'The situation of individuals cannot be understood independently of their location in social space. Poverty, for instance, cannot be defined entirely in terms of income. The degree of people's isolation and their location (town or country) can exacerbate the effects of low income. An individual who receives a minimum state pension but has a kitchen garden and enjoys close family and neighbourhood ties has a different standard of living from someone living cut off in a sixth-floor city flat.' (Rosanvallon, 1988: 206-207)

The problems of social exclusion and deprivation can be found across all types of property tenure in areas of the country where structural problems have led to a significant proportion of the adult population being excluded from stable and well-remunerated employment. They exist wherever there are local factors that have created,

'Pockets of intense deprivation where the problems of unemployment and crime are acute and hopelessly tangled up with poor health, housing and education. *They have become no go areas for some and no exit zones for others.*' (SEU, 1998, emphasis added)

There are, in essence two policy strands emerging from government aimed at improving equality and reducing social exclusion. These can best be summarised as the macro and the micro.

Macro policies are those which are generally aimed at spatial areas or broad groups of individuals to try and raise the quality of the environment or reducing barriers to social inclusion. One example of this is the regeneration of a 'deprived' area (as defined by a multitude of criteria) which aims to improve the general affluence of that area. Another is an initiative aimed at reducing, for example, child poverty.

One effect of this type of policy is that the lifting effect is not shared equally by all those within the area or class targeted. Often, those who benefit most from such schemes are those who occupy the middle ground.

Micro policies are those aimed at individuals. These include schemes aimed at assisting those dependent on welfare benefits back into work.

The most striking micro policy specific to motorcycles aimed at reducing social exclusion is the 'Wheels to Work' initiative. These are, 'Schemes which provide transport solutions to individuals who are experiencing difficulties in accessing training, employment and/or educational opportunities, due to a lack of suitable public or private transport.' (CA, 2000: 8)

Although Wheels to Work schemes are largely aimed at rural areas, this recognises the contribution that motorcycles can make to enabling individuals to be economically active.

For some, a motorcycle provides a cheaper alternative to the car. The purchase and running costs make them accessible to people on a low income. In some cases, running a small PTW can be cheaper than using public transport (MCIA, 2001).

Motorcycles are available from the age of 16, potentially giving young people independence, relative freedom of movement and access to opportunities not readily accessible through public transport.

Many vulnerable individuals find that a motorcycle, especially when used with protective clothing, gives them a feeling of personal security – freedom from being attacked either in a car or on public transport (MAG, 2005a).

Motorcycles are useful in areas not well served by public transport. Many journeys that originate in such areas have their destination in urban centres that suffer problems of traffic congestion. As well as presenting transport opportunities to more rural inhabitants, use of motorcycles can also help reduce the pressures on urban roads. Although London is well served by public transport, requiring motorcyclists from outlying areas to use mixed mode transport (motorcycle from home to station, public transport to complete the journey) could place significant financial burdens on low income workers.

There are problems of motorcycle theft and associated anti-social behaviour in some areas which score highly on indices of social deprivation (Islington, 2005: 120), although this is more of an issue of concern for anti-social behaviour units and the police than representing an issue in relation to sustainable transport.

Regional Policy

With respect to London, the lack of a co-ordinated approach to its governance was noted in the White Paper:

‘There is currently no single body in overall charge of co-ordinating transport in London. There are many different players – central Government, boroughs, nationalised industries, quangos, private sector operators, and a variety of *ad hoc* arrangements, but no one can pull all their initiatives together. In London this fragmentation is a serious obstacle to pursuing the integrated approach which we want to see.’ (DETR, 1998: 94)

The White Paper noted that the government intended to establish a Greater London Authority with a directly elected Mayor, who would be required to produce, amongst others, strategies for transport and spatial development. Although the Mayor was to be given considerable power to control and co-ordinate transport and transport policy, the White Paper noted that the boroughs would still have a role at the local level (DETR, 1998: 94-95).

In London, the principal transport planning document is the Mayor’s Transport Strategy (MTS) (GLA, 2001b). This outlines the strategic proposals and policies for transport for those aspects over which the mayor had, or expected to achieve, control. This includes the bus and underground network, as well of the Transport for

London Road Network. The MTS also provided a set of guiding principles to the 33 London boroughs, which are responsible for implementation at a local level on borough roads. The MTS is designed to be in force for ten years (2001-2011) as opposed to the five-year life-span of Local Transport Plans in other transport planning authorities.

The overall aims of the MTS are to help: 'Develop London as an exemplary sustainable world city' and to make London, 'A prosperous city (...) A city for people (...) An accessible city (...) A fair city (...) and a green city (GLA, 2001b: 4).

These aims cannot be viewed in isolation. As Banister (2005) has noted, sustainable transport is essentially predicated on urbanization. Each of these aims contributes towards a branch of sustainability: economic, environmental and social. has a part to play. The prosperity is essential to maintaining London as the economic powerhouse, while remaining a city that is attractive enough for people to want to live in. As is noted elsewhere in the MTS, there are significant areas of deprivation in London, and it is regarded as essential for the transport strategy to deliver a transport system that assists in reducing social exclusion.

There are three main areas of the MTS that concern motorcycles: the congestion charge, access to bus lanes and parking. The MTS also established the London Motorcycle Working Group (GLA, 2001b: 202). These are discussed later in this section.

Local Policy

Each of the 33 London Boroughs have prepared Local Implementation Plans: their strategy document for the implementation of the MTS at a local level. Although the Mayor's Transport Strategy (GLA, 2001b) was adopted in June 2001, the finalisation of the Strategy was delayed from its initial timetable. The Greater London Authority Act 1999, s.145 required that:

'As soon as practicable after the Mayor has published the Transport Strategy' each of the London Boroughs produce a 'Local Implementation Plan' containing the Borough Council's proposals for the implementation of the Transport Strategy in its area.

As a consequence of delay in adopting the MTS, Boroughs were permitted to produce non-statutory Interim Local Implementation Plans (ILIP) in July 2001. The ILIP provided a policy context for boroughs' programmes, while the funding bids and implementation timetables were set out in the complimentary Borough Spending Plans (BSP). Interim Local Implementation Plans were, however, required to be consistent with the then Draft Transport Strategy (Islington, 2001: 8)

Interim Local Implementation Plans were intended to be in force for five years, as opposed to the ten of the Mayor's Transport Strategy, and, as mentioned above, have come to the end of their term. The mayor of London is currently in the process of approving the boroughs' Local Implementation Plans. According to Transport for London:

'A Local Implementation Plan (LIP) is a statutory document that must set out a plan of how a borough proposes to implement the MTS in its area. It gives London local authorities the opportunity to present their full range of transport initiatives and projects and to show how and when they will address local transport issues through delivery of the MTS in an integrated manner.' (TfL, 2004a: 7)

The guidance further required that:

'LIPs must be based on realistic planning assumptions and should not be used as aspirational bidding documents. Proposals should be practical, sustainable, fundable (so far as can currently be predicted), represent good value for money and have the support of relevant partners.' (TfL, 2004a: 7)

Transport for London note that part of the purpose of the LIP guidance is to 'provide an up-to-date policy context for LIPs.' (TfL, 2004a: 7) However, unlike the Local Transport Plans that were prepared elsewhere in England in 2005/2006, the Local Implementation Plan is not a Transport Plan. The function of the LIP is to implement the Mayor's Transport Strategy (MTS). This is potentially a missed opportunity, as in the four years since the adoption of the MTS, there have been a number of policy advances regarding all forms of transport.

In their guidance on Local Transport Plans, the Department for Transport notes (in Part 2, paragraph 45) that:

'In developing their programmes, local transport authorities are expected to show that they have considered the services and facilities they provide to all

users of local transport networks. Local Transport Plans must therefore not only provide solutions and opportunities for drivers, walkers, cyclists, and bus and tram users, but also taxi and private hire vehicles, freight and distribution vehicles, coaches, motorcyclists, wheelchair users and equestrians.’ (DfT, 2004a)

With regard to motorcycling, these include the final report to government from the Advisory Group on Motorcycling (GAGM, 2004), the Government’s Motorcycling Strategy (DfT, 2005a) and the Institute for Highway Incorporated Engineers’ Guidelines for Motorcycling (IHIE, 2005). Those latter two documents in particular argue that motorcycling should no longer be a forgotten form of transport but needs to be considered at the heart of transport policy along with all other transport modes.

However, as noted above, the Local Implementation Plan is not a transport plan in and of itself, but is a document that sets out how the MTS is to be implemented at a local level. What has been made clear by TfL is that no deviation from the MTS will be tolerated (LMWG, 2005a).

In the guidance on LIPs issued by the Mayor (TfL, 2004a), the overarching objectives of promoting safety, encouraging sustainable travel, achieving a balanced approach to road-space allocation, promoting equality and social inclusion and facilitating sustainable development were outlined. An brief outline of the negative and positive contributions motorcycles could make in facilitating the implementation of these objectives is given in table 5 below.

MTS Overarching Objective	Potential role of motorcycles
Promoting safety	⇒ Motorcycles have a poor safety record (DfT, 2004d). ⇒ In Greater London the casualty rate is lower than the rest of the UK (TfL, 2004c). Once a certain level of motorcycle use is established, there is an inverse relationship between casualty rates and levels of use (TfL, 2004c)

MTS Overarching Objective	Potential role of motorcycles
Encouraging sustainable travel	<p>⇒ Motorcycles represent a form of private motorised transport that is, perhaps inherently unsustainable (Banister, 2005). Some emissions lower than cars, others higher. PTW emissions limits one Euro standard behind cars (GAGM, 2004). Motorcycle noise distinctive with problem of illegal exhaust fitments, noise limits higher than for cars (GLA, 2004b). Modal shift to motorcycles in London tends to come from public transport (Halcrow).</p> <p>⇒ Motorcycles placed 'higher' in the transport hierarchy than cars (DETR, 1998). Congestion charge demonstrates 10% of modal shift from cars moves to motorcycles (TfL, 2004c). Motorcycle fuel consumption generally lower than comparative cars (GAGM, 2004; MCIA, 2001). Government policy is to tackle those mode that contribute most to emissions (DfT, 2005a). Motorcycles cause minimal damage to the road surface (IHIE, 2005).</p>
Achieving a balanced approach to road-space allocation	<p>⇒ Motorcycle occupancy rates lower than for cars or buses (DfT, 2004b).</p> <p>⇒ Motorcycles occupy less road space than cars when moving, and potentially less than bicycles (VMAC, 2000). Potential to park between 5 and 8 motorcycles in the space required for a car (DfT, 2005a).</p>

MTS Overarching Objective	Potential role of motorcycles
Promoting equality and social inclusion	<p>⇒ Private transport is inherently unequal. Small motorcycles vulnerable to theft and subsequent use in anti-social behaviour (Islington, 2005)</p> <p>⇒ Motorcycles can provide a cheaper alternative to the car (GLA, 2001b) and can be cheaper even than public transport (MCIA, 2001). Can be useful in areas not well served by public transport, are available from age 16 and can assist people to become economically active (MAG, 2005a; CA, 2002). Can provide personal security to vulnerable individuals (MAG, 2005a).</p>
Facilitating sustainable development	<p>⇒ Higher density development will lead to more pressure for parking and roadspace use by all types of vehicles, including motorcycles (GLA, 2004a).</p> <p>⇒ Encouraging modal shift away from cars will have greater impacts on road space usage than concomitant increase in motorcycle use (TfL, 2004d).</p>

Table 5: Summary of Mayor's Transport Strategy Overarching Objectives

London Motorcyclists

The data from the Institute of Transport Studies' survey of motorcyclists suggest that London motorcyclists tend to be younger than their non-London counterparts, with mean ages of the two samples of 41.94 and 43.87 respectively. The modal age for London riders, however, was younger, falling into the 35-40 age group as opposed to the 40-45 age group for non-London riders.

As well as being younger, more London motorcyclists (23%) were single as opposed to the non-London sample (16%), and the non-London group had, on average, more children.

A higher proportion of London motorcyclists earn over £30,000 (50%) as opposed to those from the rest of the country (26%), with 20% of the London motorcyclists earning over £60,000, as opposed to 4% of non-Londoners. As the report notes, many of these differences are a reflection of the socio-demographic differences between London and the rest of the UK.

The survey revealed that most riders have a car licence, with 95% of the London sample holding a full car licence and 92% elsewhere. There was also little difference in the propensity to own one or more cars (88% in London, 91% elsewhere). This is similar to the thesis survey which found that 68% of London respondents and 74% of non-London respondents had a car. The discrepancies between the two sets of data could be a reflection of the different sampling techniques of the two surveys. London riders were more likely to own only one motorcycle (73%) than non-London riders (60%). London riders are more likely to own smaller motorcycles, as illustrated in Figure 9 below (ITS, 2004: 5-9).

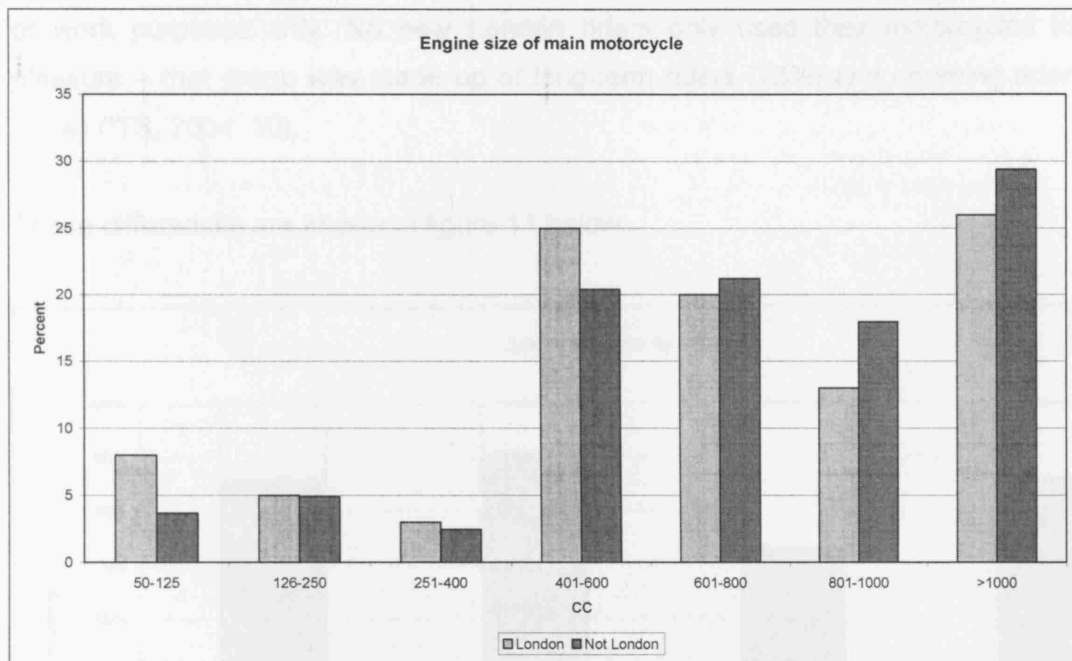


Figure 10: Engine Size of main motorcycle – Thesis survey

Many smaller motorcycles are classed as 'scooters', and a casual examination of central London motorcycle parking bays reflects their popularity. According to the ITS survey, approximately only 25% of London riders have scooters or mopeds, and they represent a higher proportion of the commuter fleet (ITS, 2004: 9).

A higher proportion of London riders (28%) are only commuter or work riders (which includes couriers), compared to non-London riders (11%), whereas fewer London riders are leisure only riders (14%) compared to non-London riders (32%). The proportion of multi-use riders was similar across the two groups. The survey revealed that those who only used a motorcycle for commuting or work tended to have smaller machines, whereas the leisure only riders tended to have larger machines (ITS, 2004: 9). This, in part, reflects the utility of different types of motorcycle.

The ITS survey showed that approximately one third of London riders were new riders (34%), approximately half were long-term riders (52%) and only one sixth returning riders (14%). This contrasts with the rest of the country, where the majority were long term riders (56%), a fifth were new riders (21%) and about a quarter were returning riders (23%). These proportions are reflected in the make-up of multi-use riders in London. London commuters featured the highest proportion of new riders,

at just under half, with only 10% of returning riders using their bikes for commuting or work purposes only. No new London riders only used their motorcycles for pleasure – that group was made up of long-term riders (73%) and returning riders (27%) (ITS, 2004: 10).

These differences are shown in figure 11 below.

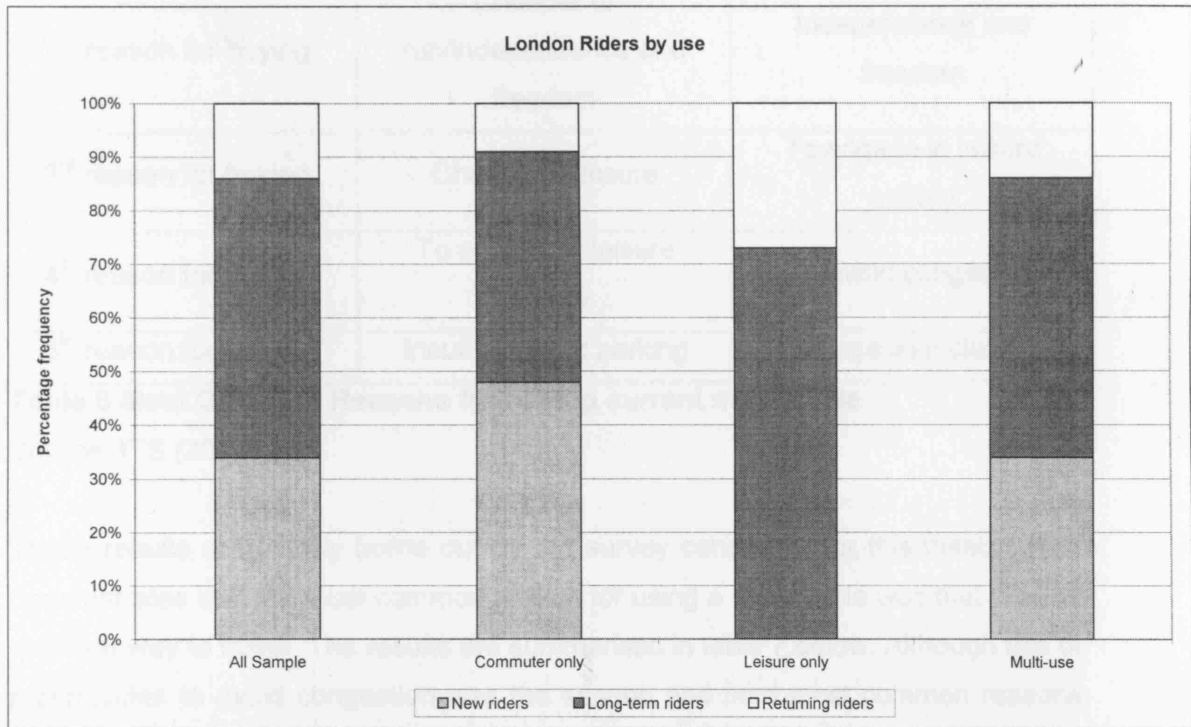


Figure 11: Use patterns of London riders

Source: ITS, 2004: 10

These results from the ITS survey support the supposition that the growth in motorcycle traffic can largely be attributed to commuters, and that many of these new commuters are new, rather than returning, riders.

According to the ITS report, London motorcyclists tend to buy motorcycles for transport-related reasons, rather than for a love of motorcycles or for the 'image.' These findings are summarised in table 6 below. What is not made clear is whether the congestion that is to be avoided is on the roads or on public transport. While it might appear self-evident that it is to avoid congestion on the roads, this is not borne

out by the Halcrow study¹, which indicated that in areas of high public transport provision modal shift to motorcycles tended to come from public transport, and in areas of low public transport modal shift to motorcycles tended to come from cars.

Most Common Reason	London	Non London
1 st reason for buying	To avoid congestion	Love of motorcycles
2 nd reason for buying	Cheaper to run/independence and freedom	Independence and freedom
3 rd reason for buying	Cheaper to insure	To engage in leisure activity
4 th reason for buying	To engage in leisure activity	To avoid congestion
5 th reason for buying	Insufficient car parking	Image associated

Table 6 Most Common Reasons for buying current motorcycle

Source: ITS (2004: 11)

These results are largely borne out by the survey conducted for this thesis which demonstrates that the most common reason for using a motorcycle was that it is the quickest way to travel. The results are summarised in table 7 below. Although use of motorcycles to avoid congestion was the second and third most common reasons for using motorcycles among London and non-London riders respectively, avoiding the congestion charge itself was the least common reason in both cases. This could be a reflection of the fact that motorcycles are exempt from the congestion charge, or it could be a minor consideration in relation to the other reasons. The third most common reason for using a motorcycle in London is as a preference to using public transport. This supports the conclusion from the Halcrow study which suggested that in areas of high public transport provision, modal shift to motorcycles tends to come from public transport rather than from cars.

¹ The Halcrow Report, 'Motorcycling and Congestion' was produced for the Department for Transport in 2001 and pre-dated the Department's publication regime. Only a summary has been made available to the public.

Most common reason	London	Non London
First reason	Quickest way to travel	Quickest way to travel
Second Reason	To beat congestion	Other
Third reason	Prefer not to use public transport	To beat congestion
Fourth Reason	Easier to park	Easier to park
Fifth Reason	Other	Cost
Sixth Reason	Cost	Prefer not to use public transport
Seventh Reason	Use for work	Use for work
Eighth Reason	To avoid congestion charge	To avoid congestion charge

Table 7: Most common reason for using motorcycle

The ITS report suggests that London riders make, on average, twice as many commuting or at work trips than those in the rest of the UK. This relationship is not seasonal, although as can be seen from figure 12 below, more trips are made during the spring and summer than the winter months. The dip in August can probably be attributed to holidays.

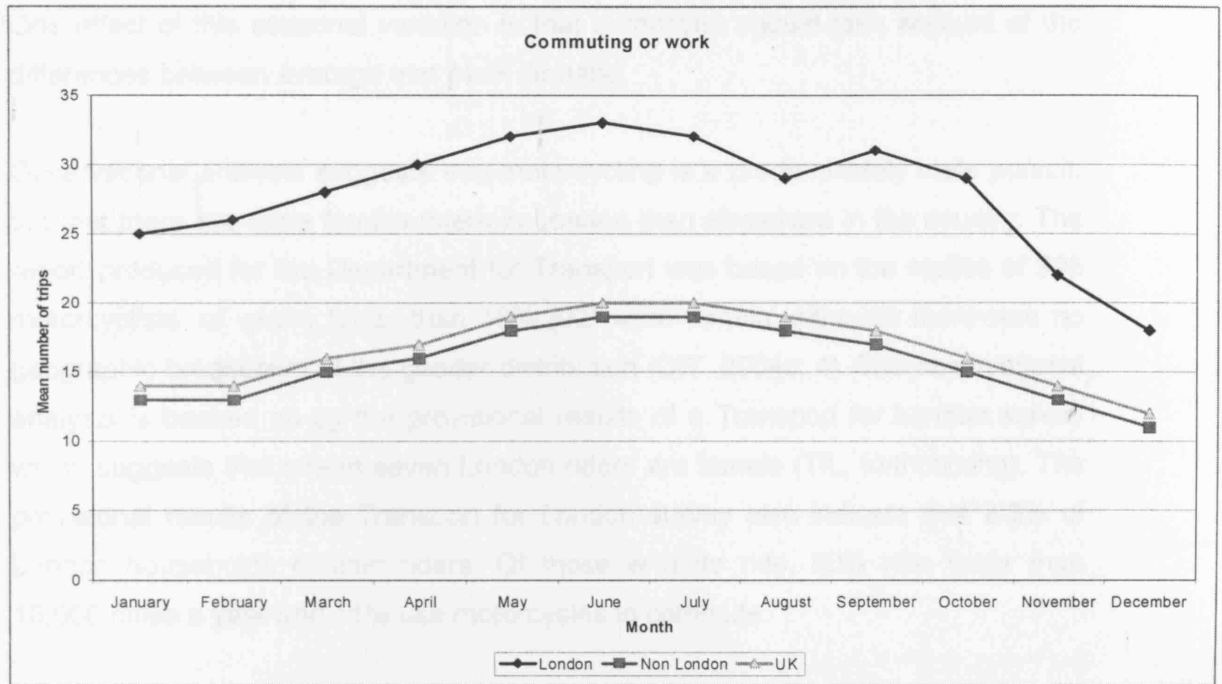


Figure 12: Work-related motorcycle use

Source: ITS, 2004: 12

London riders make fewer pleasure trips than those in the rest of the country, as illustrated in figure 13 below. The variation in this is again seasonal.

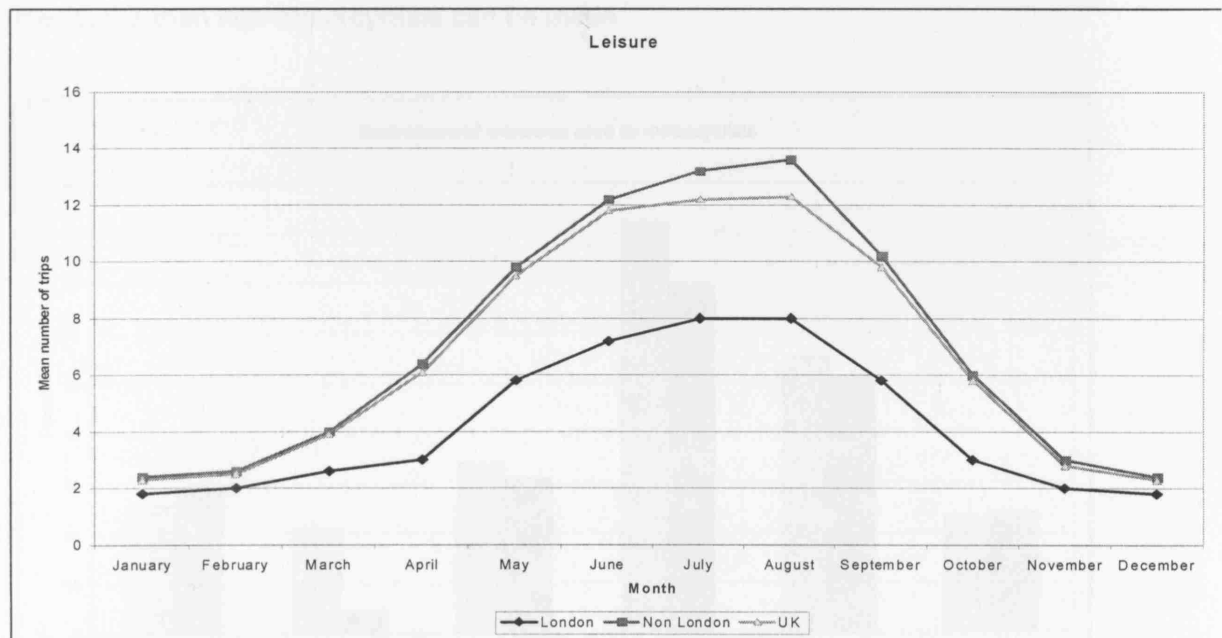


Figure 13: Leisure-related motorcycle use

Source: ITS, 2004: 12

One effect of this seasonal variation is that authorities should take account of the differences between average and peak demand.

Safety

Observational analysis suggests that motorcycling is a predominately male pursuit, but that there are more female riders in London than elsewhere in the country. The report produced for the Department for Transport was based on the replies of 995 motorcyclists, of whom fewer than 10% (92) were female, although there was no geographic breakdown of the gender distribution (DfT, 2004c: 4). The observational analysis is backed up by the provisional results of a Transport for London survey which suggests that one in seven London riders are female (TfL, forthcoming). The provisional results of the Transport for London survey also indicate that 2-3% of London households contain riders. Of those who do ride, 90% ride fewer than 10,000 miles a year and 71% use motorcycles to commute.

According to the survey conducted for this thesis, London motorcyclists have a greater propensity to use environmental measures than their non-London counterparts. This is shown in figure 14 below. Although these results indicate that London motorcyclists use more environmental measures than those elsewhere in the country, a comparative survey of non-motorcyclists was not undertaken. Therefore, no conclusion that motorcyclists are either more or less likely to use such measures than non-motorcyclists can be made.

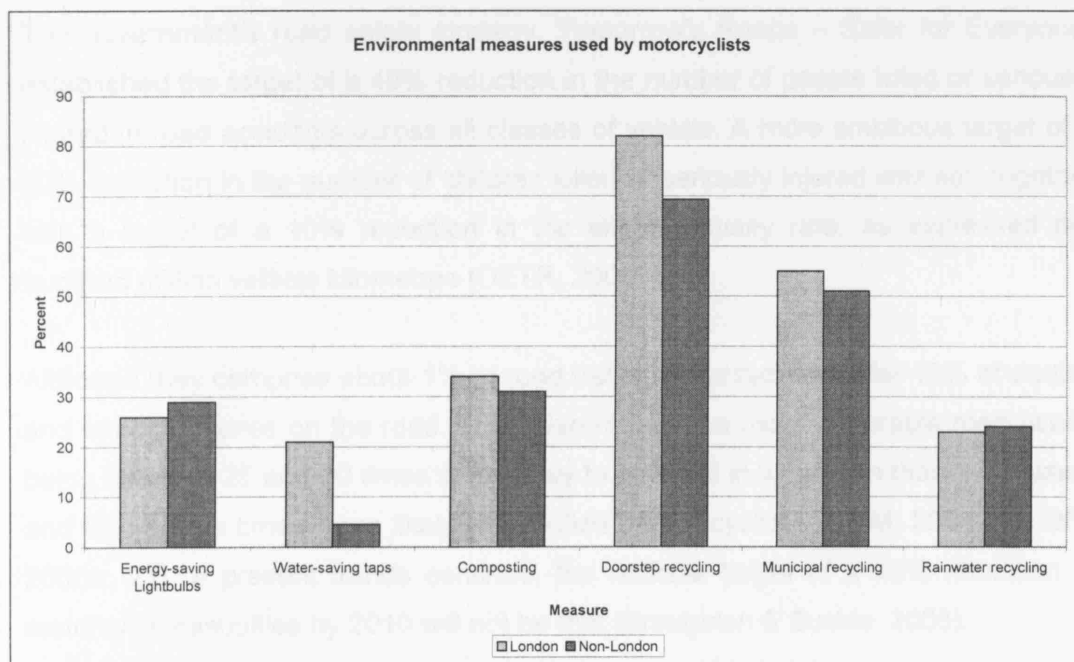


Figure 14: Environmental measures used by motorcyclists

Safety

Road safety is one of the main aspects of transport policy. A requirement of a sustainable transport system is that it be safe for the users. As noted previously, motorcycle registrations began to increase in 1996 following a fourteen-year period of decline. At the time the Integrated Transport White Paper was being prepared, motorcycle casualties were increasing faster than the rate of increasing registrations (DETR, 2000: 58). The White Paper noted:

'Despite the real and very welcome reduction in the number of motorcycling casualties in recent years there were still over 24,000 motorcycle riders and their passengers killed or injured on roads in 1997 – 7.5% of all casualties but 14% of deaths and serious injuries. In built-up areas, motorcycles are three times more likely than a car to have an accident involving a pedestrian.' (DETR, 1998: 77)

The White Paper further noted that:

'One of the concerns raised by motorcycle groups is that the high casualty rate of motorcyclists is due to vehicle drivers not taking enough account of their needs.' (DETR, 1998: 71)

The government's road safety strategy, *Tomorrow's Roads – Safer for Everyone*, established the target of a 40% reduction in the number of people killed or seriously injured in road accidents across all classes of vehicle. A more ambitious target of a 50% reduction in the number of children killed or seriously injured was set, together with a target of a 10% reduction in the slight casualty rate, as expressed per hundred million vehicle kilometres (DETR, 2000: 5).

Although they comprise about 1% of road traffic, motorcyclists suffer 18% of deaths and serious injuries on the road. They also remain the most vulnerable road users, being between 25 and 30 times more likely to be killed in a collision than a car users and four or five times more likely to be killed than a cyclist (GAGM, 2004: 11, DfT, 2005a: 27). If present trends continue, the national target of a 40% reduction in motorcycle casualties by 2010 will not be met (Broughton & Buckle, 2005).

The report produced by the Institute of Transport Studies (DfT, 2004c) noted that the rise in accidents involving the death or serious injury of motorcyclists in Great Britain is nearly entirely specific to riders aged between 25 and 59. The report notes that little is known about the current population of motorcyclists in the UK and whether their demographics have changed in recent years. The Department for Transport funded an 'Older Motorcyclist' project, which was set up in part to analyse the characteristics of the motorcycling population. It also sought to establish whether the speculative assumption that the rise in accidents can be attributed to more mature riders returning to motorcycling after a significant (ten years) break and riding large capacity machines for leisure purposes had any basis in reality (DfT, 2004c: 2). The data established that the key indicator of a propensity to be involved in a collision is a lack of experience rather than age. A returning rider has an initial period of increased risk comparable to a novice rider. This decreases to the same level of risk as a rider who did not take a break from riding after about six weeks (DfT, 2004c).

The forthcoming motorcycle survey produced for Transport for London notes that at the beginning of the questionnaire riders initially report a degree of overconfidence in their own ability. However, 36% of the sample had had collisions in the past three years, and 86% of those collisions were in London. Half of the collisions resulted in rider injury, but only 20% of those required hospital treatment. Only 5% of the sample had had three or more collisions in the previous three years. Those most likely to have had a collision were in the 25-34 age group. Overall, motorcyclists averaged a collision every 15-20,000 miles, or once every 15-18 months (TfL, forthcoming)

Targets and Definitions

The definitions with respect to road safety have not been adequately addressed in the literature. There can, at first assumption, be little ambiguity over a fatality. However, a road traffic fatality is one which occurs as a result of the collision within 30 days. This contrast with the definition used in Italy, where fatalities are only counted in the 24 hours following the collision (MAG, 2006b: 2). A serious injury accident is one recorded as such on the STATS19 form, and usually refers to when an injured person is taken to hospital. Because of the inherent vulnerability of motorcycle riders, the effects of a collision can be more pronounced. Many motorcycle riders and passengers involved in a collision are thrown clear of their

machines, and for many the head is involved in an impact with either the ground or another object. In those circumstances a hospital visit to rule out skull fracture is highly recommended by paramedics, irrespective of the quality of helmet worn.

As can be seen from figure 15 below, motorcycle KSI numbers have increased in recent years, although most of this increase can be attributed to serious injury rather than those killed. The increase in 2003 can, in part, be attributed to the prolonged period of dry weather. Figures for 2004 and 2005 demonstrate that the numbers killed and seriously injured have reduced since then (DfT, 2006b).

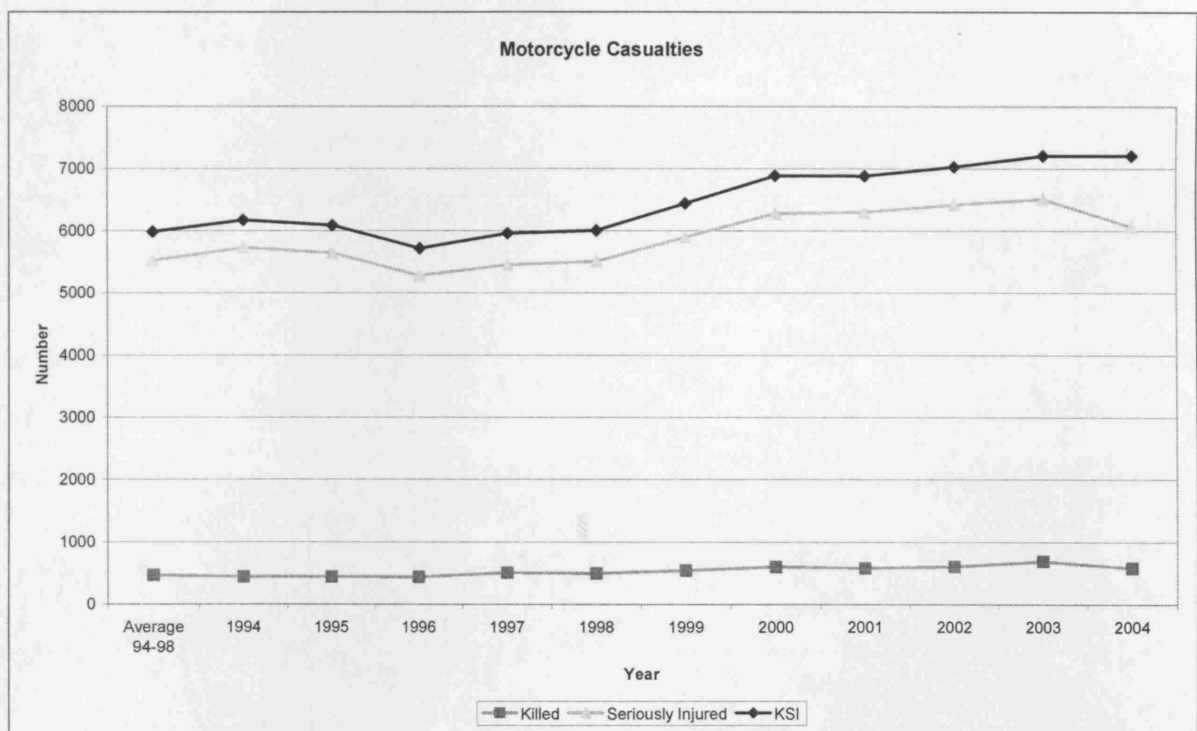


Figure 15: Motorcycle Casualties 1994-2004

Source: DfT (2004b), DfT (2005b)

The Advisory Group on Motorcycling recommended that the government take into account the casualty rate, as expressed per passenger kilometre as well as headline numbers (GAGM, 2004: 11). This recommendation was accepted and the National Motorcycling Strategy notes that the government will, 'Systematically measure motorcyclist casualty rate as a secondary indicator to the number of casualties.' (DfT: 2005a: 27).

Although KSI numbers have increased since 1994-1998, the KSI rate per vehicle kilometre is falling. In figure 16 below, casualties have been expressed as a rate per

passenger kilometre, with the 1994-1998 averages indexed at 100 in all cases. More detailed analysis shows that the killed rate is now below the 1994-1998 average, and the serious injury rate has fallen further. The fall in the seriously injured rate since 2001 follows the rolling-out nationwide of the BikeSafe initiative², although no causal link can be established, as road safety measures are never undertaken in isolation.

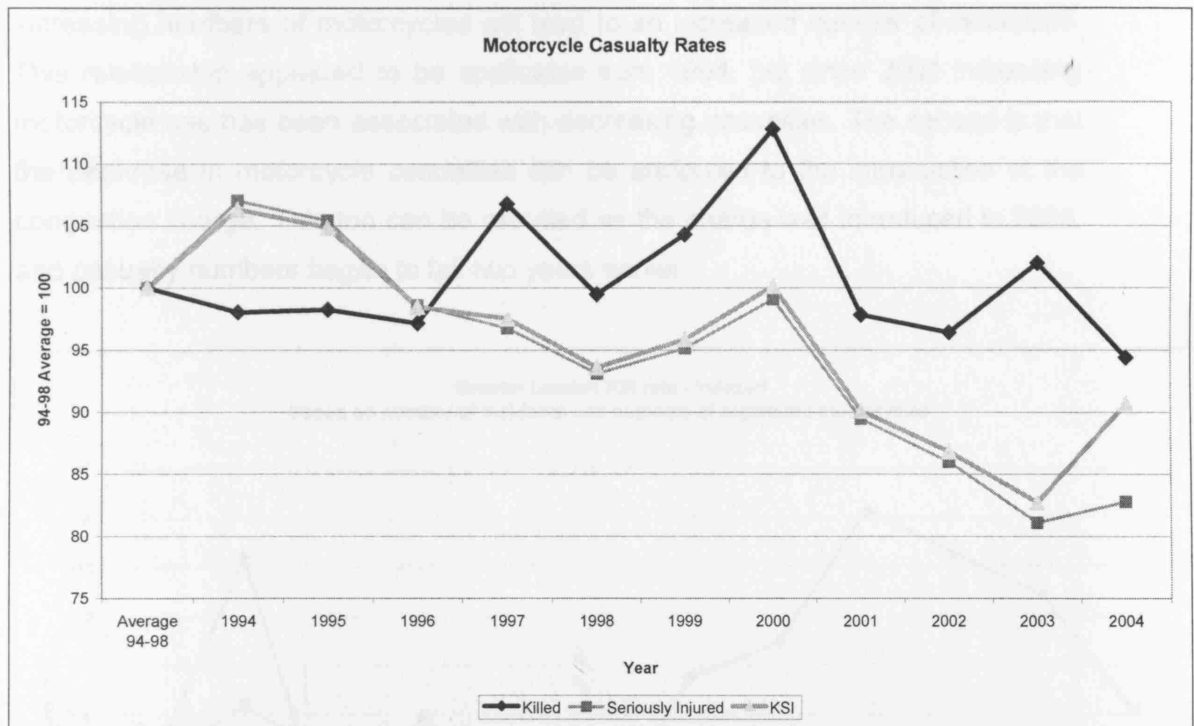


Figure 16: Motorcycle Casualty Rates, 1994-2004

Source: DfT (2004b), DfT (2005b)

Examination of casualty figures reveal different patterns of motorcycle casualties in urban and rural environments. The figures suggest that although per 100 million kilometres travelled rural involvement rates are 36% lower than for urban roads, the fatality rate is three times higher in rural areas. As approximately 60% of motorcycle traffic is on urban roads, this tends to suggest that motorcyclists are more vulnerable to injury in urban environments, they are less likely to be killed.

² BikeSafe is a national scheme organised by the Police, often with local authority support, which aims to improve riders' skills through the use of presentations and observed rides. In the first two years of operation in London there were over 2400 people who successfully completed the course (Mostyn, 2005). In 2006 a similar scheme aimed at scooter riders, known as ScooterSafe, was launched by the Metropolitan and City Police, with support from Transport for London.

In London, there have been a number of trends operating relating to motorcycle safety. The number of motorcycles in London has been increasing since 1995. The motorcycle casualty rate, as expressed in relation to the number of motorcycles registered in London, increased from 1994 to 2001 and has been falling since then, as illustrated in figure 17 below. Casualty numbers have also followed the same pattern, increasing from 1994 to 2001 and decreasing since. This raises two potentially conflicting issues. The first relates to the intuitive approach that increasing numbers of motorcycles will lead to an increased number of casualties. This relationship appeared to be applicable from 1994, but since 2001 increasing motorcycle use has been associated with decreasing casualties. The second is that the decrease in motorcycle casualties can be attributed to the introduction of the congestion charge. This too can be rebutted as the charge was introduced in 2003, and casualty numbers began to fall two years earlier.

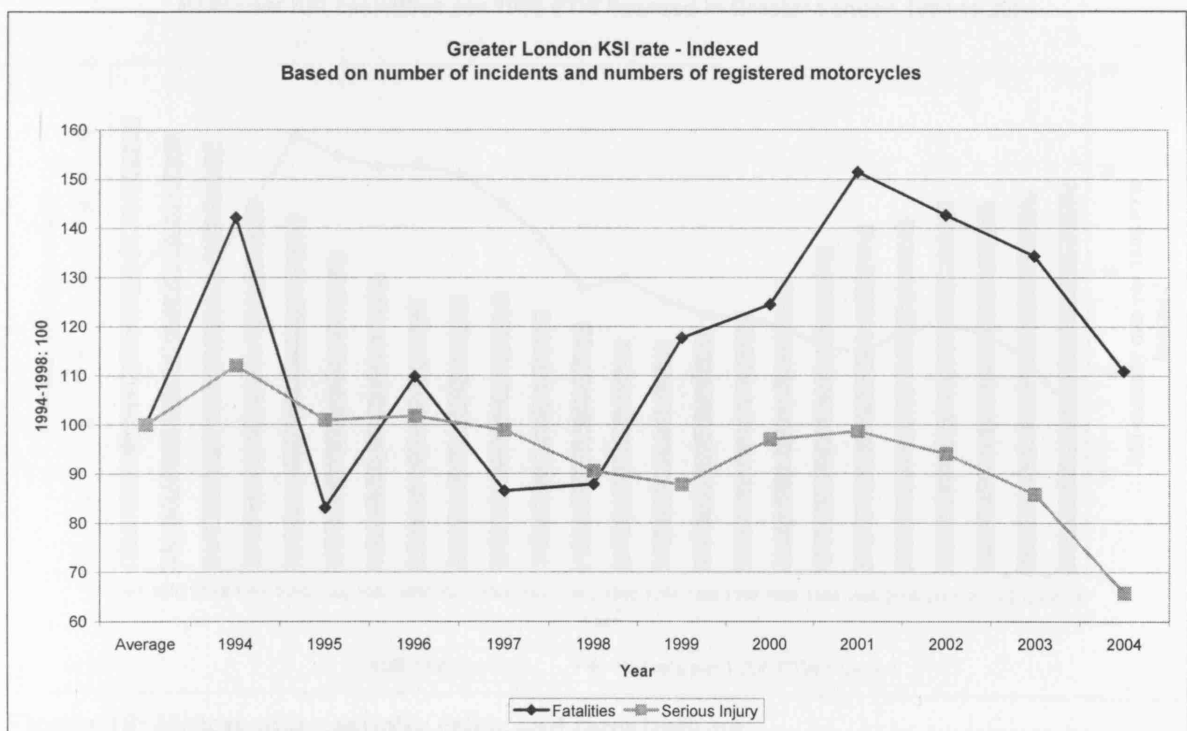


Figure 17: Motorcycle casualty rates in London

Source: TfL, 2004b, TfL, 2004c, TfL, 2005a, TfL, 2005b

NB Casualty data for 1994-2003 exclude City of London

The above figures demonstrate that, if current trends continue, the target of a 40% reduction in casualty numbers by 2010 in Greater London will not be met. If the secondary measure of the casualty rate is used, then based on current (post 2001) figures, the rate for motorcyclist fatalities will be below the 1994-1998 average, and

the serious injury rate will be more than 40% below the 1994-1998 rate per 1,000 vehicles.

If the issue of the casualty rate per 1,000 vehicles is examined over a twenty-year period, shown in figure 18 below, then it can be seen that there appears to be an inverse relationship between motorcycle numbers and motorcycle casualties. This runs counter to the popular assumption that greater motorcycle numbers result in more casualties. Transport for London use the comparator of the number of vehicles registered in London, rather than distance travelled, to calculate casualty rates as historic travel data for motorcycles are not readily available, and the number of vehicles registered is considered to be indicative of their use (TfL, 2004c).

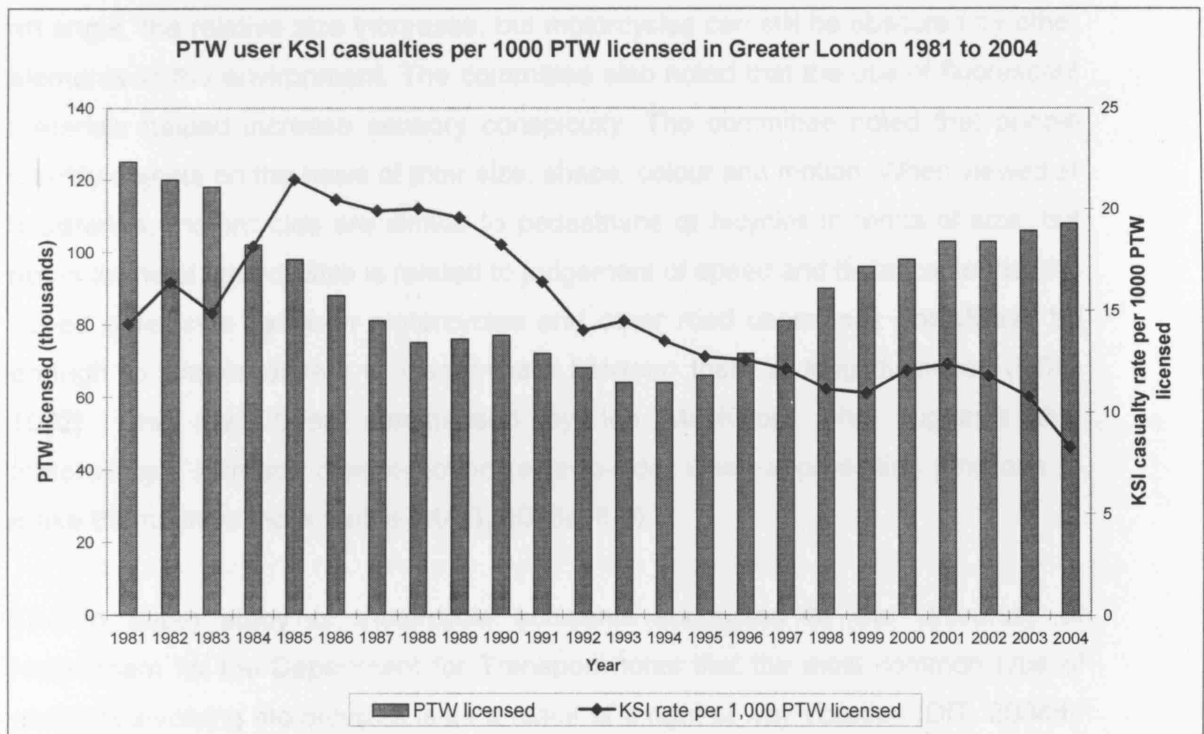


Figure 18: Motorcycle casualty rates and registrations

Source: TfL (2004b), TfL (2004c), TfL (2005b), TfL (2005c)

In a review of the literature, Huang and Preston note that there seem to be two major factors contributing to the higher accident and injury rate of motorcyclists. The first is the difficulty of detecting a motorcycle and the second is higher levels of risk taking by motorcyclists (Huang and Preston, 2004: 8).

The difficulty of detecting a motorcycle is reflected in the common expression: 'Sorry, mate, I didn't see you', an admission, often by at fault motorists, that the motorcyclist was not seen. This is also represented as the category of contributory factor referred to in the Motorcycling Strategy as, 'looked but did not see' (LBDNS) (DfT, 2005a: 28).

This highlights the issue of the conspicuity of motorcyclists, of which there are two aspects: sensory and cognitive conspicuity.

Sensory conspicuity refers to the ability of an object to stand out from its background. According to the Victoria Road Safety Committee, size is an important factor influencing conspicuity. The face-on silhouette area of motorcycle is 30-40% of a car, and can be hidden by other vehicles or street furniture. When viewed from an angle, the relative size increases, but motorcycles can still be obscured by other elements in the environment. The committee also noted that the use of fluorescent materials helped increase sensory conspicuity. The committee noted that people identify objects on the basis of their size, shape, colour and motion. When viewed at a distance, motorcycles are similar to pedestrians or bicycles in terms of size, but not in terms of speed. Size is related to judgement of speed and distance so that the speed difference between motorcycles and other road users may not always be enough to enable drivers to discriminate between them at long distances (RSC, 1992). This has been summarised by Ian MacKillop, who suggests that motorcyclists increase their x-motion (side-to-side) when approaching junctions to make themselves more visible (MAG, 2006c: 8-9).

The in depth study of motorcycle accidents conducted by the University of Nottingham for the Department for Transport notes that the most common type of accident involving motorcycles is as a result of a right of way violation (DfT, 2004d). It has been suggested that the smaller size of motorcycles make it more difficult for observers to accurately gauge the speed of an approaching vehicle. In the examples cited in the report, the drivers responsible for right of way violation failed to observe the motorcycle at all (DfT, 2004d: 22).

Cognitive conspicuity refers to the expectation of seeing the object in question. In the in-depth study, the authors note earlier research by Mannering and Grodsky (1995) which suggests that car drivers in particular tend not to see motorcyclists as they have not attuned themselves to seeing motorcyclists or necessarily perceive

them as a hazard (DfT, 2004d: 8). Motorists do not see motorcyclists because they do not expect to see them.

Figure 18 above would suggest that there is a critical level of motorcycle use that triggers the necessary degree of cognitive conspicuity of motorcyclists among other road users. This leads to what at first may seem to be a paradoxical conclusion: that the best way to increase motorcycle safety is to increase motorcycle use.

Another issue identified in the in-depth study is that motorcycling can attract risk-seeking individuals because of its reputation as a dangerous activity (DfT, 2004d: 8). In London, in part, this can be countered by the results of the Institute for Transport Studies survey which showed that the primary reason for London motorcyclists buying a motorcycle was to combat congestion, rather than for a love of motorcycling (ITS, 2004: 11). The thesis survey also indicated that London motorcyclists use their bikes because they are the quickest way to travel.

Figures from Transport for London demonstrate that within the charging zone there has been a decrease in collisions for all modes of traffic. Although there has been a slight increase in the number of buses involved in collisions, this is proportional to the increased numbers entering the zone. For cars, the decrease in collisions is proportional to the reduced numbers entering the zone; for goods vehicles the percentage decrease in collisions is double the reduction in numbers entering the zone. There has been a slight increase in the number of taxis involved, although it is approximately one quarter of the increase in taxi traffic. Transport for London note that: 'Most noticeable was the decrease in the involvement of pedal cycles and powered two-wheelers despite the significant increase in the numbers of these observed in traffic counts' (TfL, 2005a: 107). These changes are illustrated in figure 19 below.

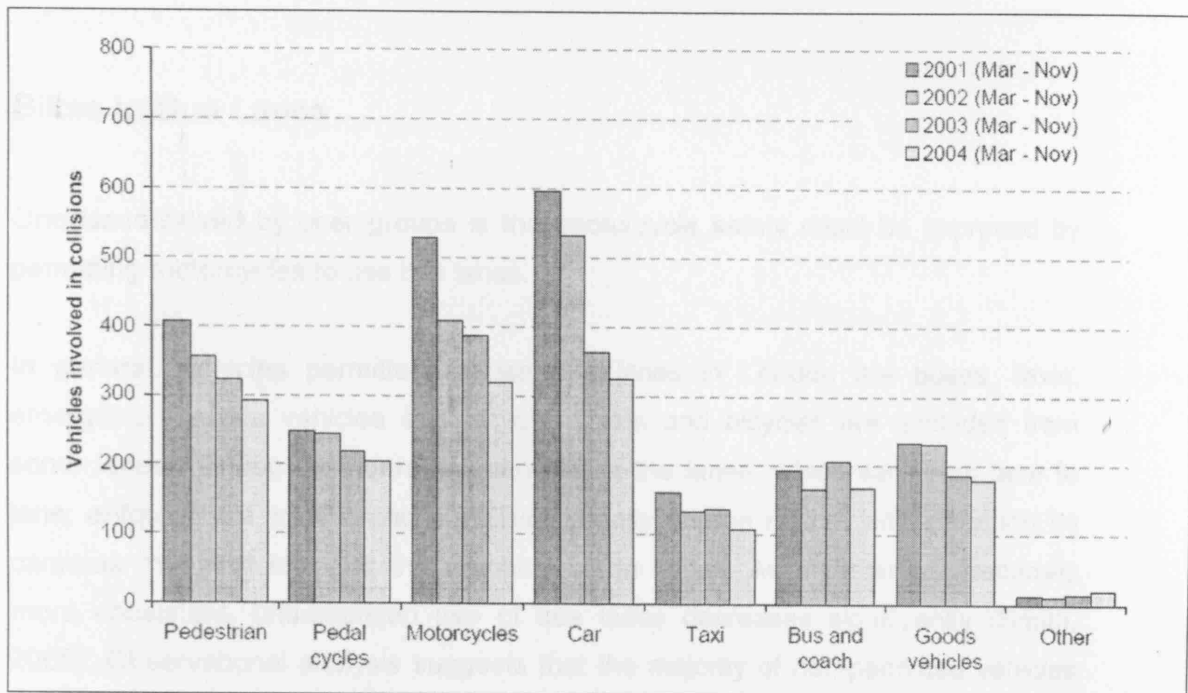


Figure 19: Accident involvement by vehicle type within the charging zone, 0700 to 1900, March to November, 2001 to 2004

Source: TfL, 2005a: 107

Transport for London further note that:

'Further analysis indicates that the reduction in involvement of powered two-wheelers and chargeable vehicles (including cars, lorries and vans) after the introduction of the scheme was significantly greater within the charging zone than across the rest of London. However, for other non-chargeable vehicles this was not the case.' (TfL, 2005b: 107)

It has been argued by some policy-makers that the increase in motorcycle traffic in central London is because of the exemption from the congestion charge. As has been shown, the increase began before the charge was introduced, partly as a response to increasing congestion in London as a whole, and partly due to the cyclical nature of the motorcycle market.

The main change that has been observed since the charge was introduced is the reduction in the number of cars entering and circulating in the zone, and with it a reduction in the number of collisions. The main beneficiaries of this safer environment have been the most vulnerable road users: pedestrians, cyclists and motorcyclists.

Bikes in Bus Lanes

One issue raised by user groups is that motorcycle safety could be improved by permitting motorcycles to use bus lanes.

In general, vehicles permitted to use bus lanes in London are buses, taxis, emergency service vehicles and bicycles (taxis and bicycles are excluded from some lanes). During the hours of operation of the lanes, which vary from lane to lane, enforcement is by a decriminalised penalty charge notice, with detection by cameras mounted either at the roadside or on buses. As enforcement becomes more consistent, unauthorised use of bus lanes decreases significantly (Smith, 2005). Observational analysis suggests that the majority of non-permitted vehicles do not use bus lanes even outside their hours of operation. This phenomenon has not been studied, but one suggested explanation is that because the hours of operation of the lanes are so varied, and the probability of receiving a penalty charge notice for unauthorised use of the lane relatively high, drivers alter their behaviour to avoid the possibility of being penalised (MAG, 2005a).

Motorcycles were first permitted to use bus lanes in Bristol in 1996, and, at the time of writing are also permitted to use bus lanes in Bath, Birmingham, Colchester, Derby, Reading, Grimsby, Hull, Swindon, Sunderland, Northern Ireland, Sheffield, Doncaster and Peterborough. They are also permitted to use the M4 east bound bus lane between Junction 3 and the elevated section in Chiswick. It has been argued that permitting motorcycles to use bus lanes improves motorcycle safety, and those towns which do permit access report no adverse effects of the measure (BMF, 2005). A forthcoming report from the Transport Research Laboratory also suggests that motorcycles should be allowed to use bus lanes for safety reasons (LMWG, 2005b).

In September and October 2002, Transport for London instituted a trial of motorcycle use of three bus lanes on the Transport for London Road Network, with a further two corridors monitored as a control³. The trials were due to last for 18

³ The lanes opened to motorcycles were parts of the A23 in south London, the A13 in east London and A41 in north London, and the two trial corridors are part of the A10 in north-east London and the A5 in north London.

months, but as the results were inconclusive this has been extended to 36 months (TfL, 2004c). Because of extensive roadworks on the A13, the trial was further extended to 48 months to allow for a clear 36 months' worth of data (LMWG, 2005a).

The London Cycling Campaign is opposed to allowing motorcycles to use bus lanes. Their representations to a GLA Transport Committee Scrutiny Panel in 2004 (which examined the issue of continuing the bus lane trial) noted that:

'It is not at all clear how use of bus lanes can make travel safer for motor cyclists especially as it will tend to increase their speed of travel.

'Motor cycles are involved in a far higher proportion of injury crashes to cyclists and pedestrians than are other vehicles, per distance travelled. On or off the bus lane they pose an unacceptable threat to other vulnerable road users.

'Increasing capacity for motor cycles will attract more of them, the impact of this increase must be judged across the whole of London's road network not only on the bus lanes.

'Any policy which encourages more motor cycle is misguided and does not help solve any of the problems caused by traffic congestion. It merely replaces one type of congestion with a more pernicious one.

'Motor cycles in bus lanes and cyclists' Advance Stop Line zones already have an intimidating effect which counteracts the Mayor's and Government's policies to increase cycling for the benefit of all.

'Motor cycle use also impacts negatively on other transport, health and environmental policy targets of the Mayor. For each passenger kilometre travelled motor cycles put out more of many dangerous pollutants than other transport and they very much noisier.' (LCC, 2004: 2)

As noted above, the interim results of London bus lane trial were inconclusive (TfL, 2004d). The results of the full trial have been partially analysed, and the full results are expected in January 2007. The initial executive summary report prepared for Transport for London did not reveal a statistically significant difference in motorcycle or other casualties on the three trial routes when compared to the rest of the Transport for London Road Network. They also demonstrated that the feared increase in collisions between motorcyclists and cyclists and pedestrians did not happen (Duckham, 2006). Since the bus lane trial commenced, cycle use in greater London has increased, notwithstanding increased motorcycle use (TfL, 2006),

indicating that cyclists are not discouraged by greater numbers of motorcycles in circulation.

Emissions

One of the aspects of sustainable transport identified in part one was a requirement to improve air quality.

From June 2003, all new motorcycles had to meet Stage II pollution limits⁴, and from 2006/7 will have to meet Stage III limits. However, motorcycle emissions will remain one Euro stage behind passenger cars.

The emissions standards for cars and motorcycles are summarised in tables 8 & 9 below.

Date	Engine Size	Emissions Limits (g/km)		
		CO	HC	NO _x
Limits effective from 1999	Two-stroke	8.0	8.0	0.1
	Four Stroke	13.0	3.0	0.3
Limits effective from 2003	<150cc (class I)	5.5	1.2	0.3
	>150cc (class II)	5.5	1.0	0.3
Limits effective from 2006	<150cc (class I)	2.0	0.8	0.15
	>150cc (class II)	2.0	0.3	0.15

Table 8: Emissions limits for motorcycles

Source: GLA, 2002: 148

Stage	Date	Emissions g/km			
		CO	HC	NO _x	HC + NO _x
Stage I	1992	2.72			0.97
Stage II	1996	2.2			0.5
Stage III	2000	2.3	0.2	0.15	
Stage IV	2005	1	0.1	0.08	

Table 9: Emissions limits for cars

Source: GLA, 2002: 393

⁴ European Directive 2002/51/EC

The Environmental and Fiscal task force of the Advisory Group on Motorcycling noted that motorcycles produced less carbon dioxide (CO₂) and oxides of nitrogen (NO_x) than cars per passenger kilometre, but performed less well with respect to carbon monoxide (CO) and hydrocarbons (HC) (GAGM, 2004: 44)

In general, motorcycles consume less fuel than cars. While it is possible to find examples of very economic cars and very uneconomic (in terms of miles per gallon) motorcycles, on a like for like basis (small car/small motorcycle, large car/large motorcycle), the assumption holds true⁵. The other advantage that motorcycles have over cars is that they spend less time stuck in traffic congestion and therefore produce fewer emissions while idling.

Rather than paraphrase at this stage, it is perhaps worth quoting at length from the final report of the Advisory Group on Motorcycling. The environmental and fiscal task force noted that:

'Under the current Stage II pollutant emissions limits, motorcycles are approximately one Euro (emission) standard behind passenger cars in their environmental development. This has been achieved by more efficient engine design, fuel injection to improve fuel metering, air injection in the exhaust stream and simple catalytic converters. There is room for further improvement with further technology, it is recognised that the motorcycle industry and its market is smaller than that of cars and this can affect the rate of technological change. Nevertheless there are indications that Stage III emission standards for motorcycles, that will enter into force in 2006-07, will see changes that are already commonplace in passenger cars. This will include the phasing out of carburettors in favour of fuel injection systems to achieve more efficient combustion leading to reduced HC and CO emissions and greater use of closed loop catalytic converters which generate a reducing reaction addressing NO_x as well as oxidising reactions to ensure the complete combustion of HC and CO. It should be noted that closed loop catalytic converters which require a stoichiometric mix are likely to increase fuel consumption and CO₂ emissions.

⁵ Data from Vehicle Certification Agency

'As a result of these findings and subject to the caveat in paragraph 150⁶ above, the Task Force concludes that motorcycles, through lower energy requirements, use less fuel and emit far less CO₂ than cars. In terms of pollutant emissions, they emit less CO and are likely, from 2006/7 onwards, to be emitting less NO_x and about the same volume of hydrocarbons. Taken as a whole based upon the above, the emissions performance of motorcycles is seen to be better than cars. It was also noted that emissions limits are part of the European Union's institutions' competence on which the Task Force can have little bearing.' (GAGM, 2004: 45)

This finding is reflected in the government's motorcycle strategy which notes that the total level of emissions from motorcycles is minimal compared to other traffic sources. The government's priority is to focus on the more significant sources of pollution, but expects the motorcycle industry to further refine the engine and emissions performance of motorcycles (DfT, 2005a: 12).

While motorcycles do produce emissions that are believed to contribute towards global warming, their contribution of CO₂ is proportionately less than that of cars. With respect to overall emissions, the contribution made by motorcycles is considered to be minimal.

Overall, road transport produces 58.2% of NO_x and 67.9% of PM₁₀ in London (GLA, 2002: 88), while motorcycles produce 0.1% of NO_x, 0.6% PM₁₀ for in London from 2.1% of vehicle Km travelled (GLA, 2002:147). This demonstrates that the relative contribution motorcycles make to NO_x emissions is proportionate to their use, while their PM₁₀ emissions are significantly less in proportion to other vehicles.

Figures for emissions and fuel consumption are not included in advertising for new motorcycles. Emissions standards only apply to new motorcycles and emissions are not tested at the MoT test stage. Vehicle Excise Duty for motorcycles is formulated by engine size and not emissions, whereas Vehicle Excise Duty rates for cars are based on CO₂ emissions (for cars registered after 1 March 2001), and emissions are tested at the annual MoT.

⁶ That the sample size was quite low and broadly spread across the engine capacity range. GAGM noted that further research was needed.

Foley & Fergusson also note that CO₂ emissions produced by motorcycles have remained relatively constant since 1990 (2003: 7). This is despite increasing motorcycle use.

They suggest that reducing CO₂ emissions from road transport be adopted as a priority by the UK government. The techniques they envision are:

- Using price signals to reduce traffic growth (fuel taxation and congestion charging)
- Extending and developing voluntary agreements for improving the fuel efficiency of vehicles
- Encouraging innovation and long-term investment in future low carbon vehicles

There is a causal link between fuel consumption and CO₂ emissions. As noted above, data on motorcycle fuel consumption is not readily available, although there is a correlation between engine size and CO₂ emissions. In the survey undertaken for this thesis, this correlation can be seen in figure 20, although the fuel consumption figures are self-reported. What the figures also demonstrate is that the majority of larger (in excess of 800cc) motorcycles have reported fuel efficiencies in excess of 30 miles per gallon (less than 9.5 l/100km). The ranges of fuel efficiency for the most common motorcycles (those over 400cc), was between 40 mpg (7 l/100km) and 60 mpg (5 l/100km). This compares favourably with all but the most fuel-efficient cars.

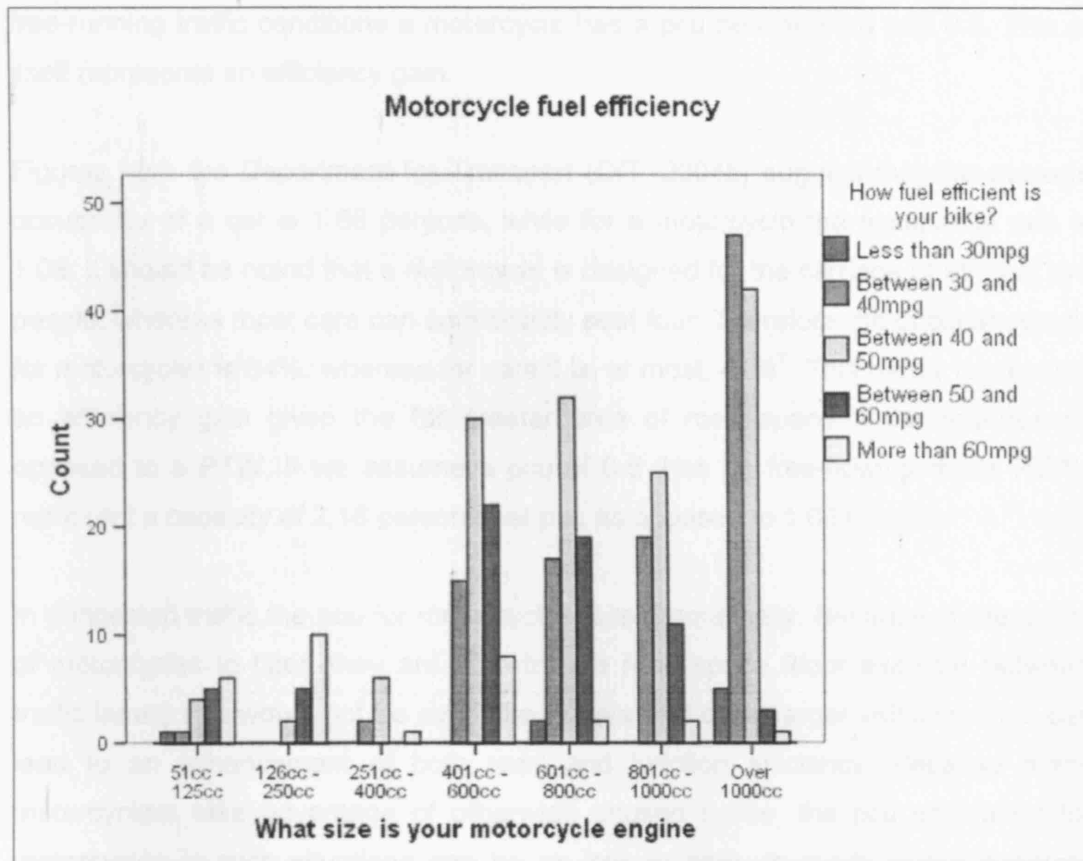


Figure 20: Motorcycle engine size and fuel efficiency

Filtering

One advantage that motorcycles have over other motorised vehicles on the road is their ability to make progress through congested traffic. This involves riding a motorcycle at a speed greater than the prevalent traffic flow either by overtaking or between traffic lanes. The practice of 'filtering' is a grey area in law. The general Police advice is that filtering is permitted provided the rider does not make progress at more than 15 mph above the prevalent traffic speed and that filtering is not done at speeds above 30 mph in the urban environment.

In research produced by Marcus Wigan for the Victorian Motorcycle Advisory Council (VMAC, 2000), an analysis of research into the contribution motorcycles make to congestion is discussed. In measuring congestion the key factor that needs to be taken account of is the useable road space that is occupied, either by a vehicle or the necessary gaps to the front and rear. The unit used to measure road space occupation is the passenger car unit (pcu). A car, by definition, has a pcu of unity. In

free-running traffic conditions a motorcycle has a pcu between 0.4 and 0.5. This of itself represents an efficiency gain.

Figures from the Department for Transport (DfT, 2004b) suggest that the average occupancy of a car is 1.66 persons, while for a motorcycle the occupancy rate is 1.08. It should be noted that a motorcycle is designed for the carriage of at most two people, whereas most cars can comfortably seat four. Therefore the occupancy rate for motorcycles is 54%, whereas for cars it is, at most, 41%⁷. This hardly represents an efficiency gain given the far greater area of road space a car requires as opposed to a PTW. If we assume a pcu of 0.5 then on free-flowing roads PTWs represent a capacity of 2.16 persons per pcu as opposed to 1.66 for cars.

In congested traffic the pcu for motorcycles falls dramatically. Because of the ability of motorcycles to filter, they are able to use road space (for example between traffic lanes) that would not be available to cars and other larger vehicles. This can lead to an enhancement of both road and junction efficiency. Because many motorcyclists take advantage of otherwise unused space, the pcu equivalent for motorcycles in such situations can be as low as zero. In roads where separate space is not provided for cyclists, the equivalent pcu value for bicycles is estimated at 0.6 (VMAC, 2000: 47-50).

The ability of motorcycles to filter has advantages other than a better use of roadspace. It enables journey times to be quicker. Because motorcycles spend less time stationary in traffic they produce fewer emissions than if they were not permitted to filter. Observational analysis reveals that there is little change in fuel consumption by a motorcycle in urban and extra-urban environments.

⁷ If an average of five seats per car is taken, the figure falls to 33%.

Noise

Motorcycle noise is often cited as a major source of environmental pollution (GLA, 2004b; Islington, 2005).

According to the Cleaner Vehicles Task Force involved in the preparation of the government's sustainable development strategy:

'Noise from road transport has, to date, been seen as an issue of less concern than climate change or air pollution. But noise is a major environmental issue which affects a large proportion of the population. Whilst the effects of ambient noise are rarely life threatening, it can have a considerable detrimental effect on people's quality of life, and may well lead to sleep disturbance and may impact on cognitive development in children.'
(DfT, 2000: 27)

It further notes that:

'Motorcycle noise can be especially intrusive. Existing maximum noise limits for motorcycles are significantly higher than for cars, and even from June 1999, when a more stringent 80 dB(A) noise limit was applied to new motor cycles over 175cc, limits will still be 6 dB(A) higher. These relatively high limits reflect the limited scope on motorcycles for cladding and other noise suppression techniques. Furthermore, the fitting by some motorcyclists of inappropriate or altered silencers, mainly on older machines, can exacerbate the problem of motorcycle noise. The UK now has one of most stringent series of regulations in force to control both construction standards for, and the sale of, replacement silencers for motorcycles.' (DfT, 2000: 28)

The Mayor's Ambient Noise Strategy makes a link between noise and air quality and notes that:

'There are strong links between noise and air quality, with obvious overlaps in objectives and policies. Both noise and air pollutants come mainly from the same sources. Reducing traffic volumes, encouraging smoother traffic flows, and using vehicles running on alternative fuels such as compressed natural gas or hydrogen (...) can both reduce noise and improve air quality.' (GLA, 2004b: 44)

Modern bikes, when supplied as standard, need to conform to the limits imposed by EU Directive 97/24/EC Chapter 9, and it is an offence to sell a silencer that does not have prescribed approval markings for use on the road. The illegal fitment of noisy after-market exhaust systems is against the law, and enforcement of noise limits is an issue for the police.

The government's motorcycle strategy notes that:

'There are other ways to address this issue. We welcome the Advisory Group on Motorcycling (AGM) recommendation for a campaign to 'win the hearts and minds' of riders to keep their machines to road legal specification. However, to be most effective, we believe that this campaign should be led by the motorcycle industry, retailers and rider user groups, rather than by Government. A campaign is more likely to receive a positive response if riders see it as an issue for those who build and sell motorbikes, and those who represent the users. We would of course support and endorse such a campaign.' (DfT, 2005a: 39)

The Mayor's Ambient Noise Strategy notes that motorcycles:

'Are often perceived as noisier, and their sounds tend to be distinctive even when not necessarily very loud. When the correct silencing equipment is not fitted, or is removed or tampered with, or when machines are poorly maintained, or ridden at excessive speeds, motorcycles can create annoyance out of proportion to their numbers. One noisy machine can influence perceptions of the rest.' (GLA, 2004b: 90)

Noise from motorcycle exhausts is not the only source of noise on London's roads. One factor that can influence noise levels is the quality of the road surface itself. A recent observational analysis noted a significant drop in tyre noise between old and new surfaces.

Research carried out by the Motorcycle Action Group suggests that some riders feel that their machine does not sound right with a standard exhaust fitment and so will fit an off-road or 'race' can to enhance the sound of their machine. Many riders also believe that a loud exhaust gives them safety benefits, by making other road users aware of their presence. The popular slogan is, 'Loud pipes save lives'. The contrary argument, that by creating excessive noise it merely serves to annoy not just other road users but also others in the vicinity who have no reason to hear a bike and

could create anti-motorcycle sentiment. The contrary slogan is, 'Loud pipes cost rides.' (MAG, 2001; MAG, 2005a).

As noted in the Mayor's Ambient Noise Strategy, alternative fuel vehicles could help reduce both emissions and noise. As far as motorcycles are concerned, a prototype hydrogen-powered fuel cell machine had to be fitted with a fake engine noise as users did not feel safe using it because it was too quiet (BBC, 2005).

Parking

Parking policies have been used a methods of demand restraint to try and curb car, and motorcycle, use. As Reg Harman (2004) notes:

'With the volume of cars now owned in Britain, it is not surprising that policies have been developed for parking (especially as every car trip requires space to park at each end of the journey). Constraining parking at destinations (...) is generally accepted as an effective form of traffic control, because if people cannot park easily at their destination, they may rethink the mode of travel, or even the choice of destination.' (p66)

Motorcycle parking can be much more land-use efficient than car parking, with between 5 and 7 motorcycles occupying the same space as a single car.

In congested areas of London, and in the central area in particular, there is high demand for motorcycle parking. As noted by Tilly (2004) this demand can often exceed supply, which can lead to frustration among motorcyclists as they try and find somewhere to park. A examination of the approach taken to this situation by Westminster City Council follows in the case study.

The Mayor's Transport Strategy advises that in areas of high demand, more motorcycle parking should be provided (GLA, 2001b: 201). However, some boroughs seem reluctant to implement this proposal. A recent survey of the London congestion charge area found on-street motorcycle parking occupancy to be 33% over its capacity (Tilly, 2004). A common practice in central London motorcycle bays is moving smaller motorcycles such that they are a physically close together as possible in order to maximise capacity of the bay. This can present some motorcyclists with difficulty in leaving the bay. This practice can damage

motorcycles, and is a potential safety risk given the weight of the machine and the possibility of it toppling over (MAG, 2006a).

Motorcycle Theft

Motorcycle user groups regularly make requests for more secure motorcycle parking to be provided in an attempt to reduce motorcycle theft. In 2000, over 28,000 motorcycles were stolen nationwide, with the City of London and Metropolitan police force areas reporting the two highest rates of motorcycle theft, at 80 and 50 thefts per 1000 vehicles respectively (ONS, 2004). A more detailed examination of the figures reveals that smaller motorcycles and scooters, as form a significant proportion of the Greater London motorcycle fleet, are far more likely to be stolen than larger machines. The Institute of Highways Incorporated Engineers notes that motorcycles are generally attractive to thieves because they are relatively light and have a high potential value (IHIE, 2005: 37). Even when fitted with locks, immobilisers, alarms and parts marking (which are rarely fitted to motorcycles as standard accessories), motorcycles are vulnerable to theft as they can be picked up and loaded into a van (Hardy, forthcoming).

Many parking authorities express a reluctance to provide extra free or secure facilities for motorcycle parking as it is a traffic management measure which has to be paid for, but generates no revenue. The major cost in providing motorcycle parking bays is the associated Traffic Management Order, which are estimated to cost about £2,500. The additional expenditure required to make the bay secure is approximately £500 (Gilchrist, 2005).

However, a reduction in motorcycle crime remains a Home Office priority (MCRG, 2004).

Parking and the environment

One of the aims of current government policies towards transport is to encourage modal shift from less to more sustainable modes. In a recent study on motorcycles and congestion and the factors that can influence the decisions to make a modal shift from cars to motorcycles it was found that:

‘For motorcycle travel, the time spent walking from the parking location to the final destination is only valued negatively when there are no specific security measures available at the parking location: if there are security measures, then the walking time has not been found to have an impact on the utility within the range examined within the experiments.’ (DfT 2004e: 9)

The range referred to in the experiments is a five-minute walk (DfT, 2004f: 30). This study also revealed that many motorcyclists experience a perceived gain, in both financial and welfare terms, from modal shift away from cars and onto a motorcycle.

The Institute of Highways Incorporated Engineers (IHIE) notes that if the environmental benefits of a switch from cars to motorcycles are to be maximised, there should be a commensurate increase in secure and convenient parking provision (IHIE, 2005: 17).

The decision to control parking is ultimately a political one, but, as noted above, the provision of parking can be a major determinant of travel demand. In London, the provision of free motorcycle parking with no time limit serves to facilitate motorcycle use, although some Councils restrict the level of parking provision to discourage motorcycle commuting (Dwyer, 2002). Observations from users note that in many town centres motorcycle bays become fully occupied by commuters early in the day making it difficult, for short-term visitors to park (MAG, 2006a). The availability of motorcycle parking is a factor that influences modal choice, and which will be further explored in the case study.

In the Royal Borough of Kensington and Chelsea, a more radical approach to motorcycle parking is to be adopted. At present, residents may apply for a motorcycle parking permit (at a cost of £18) which allows them to park in any residents’ bay throughout the borough. The Council also has dedicated motorcycle bays which are free of charge and available for any motorcyclist to use. In an attempt to address both road safety and motorcycle theft, the Council will be introducing a series of resident-only dedicated motorcycle bays which will have security features. The only vehicles permitted to park in these bays will be motorcycles displaying a residents’ permit, which will have an increased cost of £50. This charge will be reduced to £35 for motorcyclists who have undertaken an approved advanced riding course. Other motorcyclists will still be able to park in non-secure general motorcycle bays (RBKC, 2005). This represents an innovative

approach in linking crime reduction with road safety, although its effectiveness in addressing both issues remains to be seen, and could be the subject of a further study.

In Greater London, unlike in many European cities, pavement parking is not permitted. Some motorcyclists who park on pavements remove or obscure their vehicle registration number in an attempt to avoid receiving a Penalty Charge Notice. Such attempts to disguise or conceal a vehicle's identity are illegal, and many Councils in London are taking stronger enforcement action, including clamping and removing motorcycles.

There is, however, no single set of rules regarding motorcycle parking in London. In some boroughs, such as Richmond, Hackney and Haringey, motorcycles can park free of charge without the need for a permit in a residents' parking bay. In some boroughs, motorcycles are permitted to park free of charge in pay-and-display bays. In other boroughs, motorcycles can only park in dedicated bays, or are subject to similar charging regimes as cars. In Islington and Camden, motorcycles parked in residents' bays are required to have a permit (albeit at a reduced rate). Parking in pay-and-display bays is allowed, although motorcyclists are required to pay the appropriate fee and display the ticket. Tony Harms has described this last arrangement as problematic. Not all motorcycles have somewhere where a ticket could be displayed, and raises the possibility of the ticket being stolen and used in another vehicle (Harms, 2005). A summary of the rules on motorcycle parking can be found in Appendix D.

Individual Motorcycle Users

There are a number of barriers that affect the use of motorcycles. As Burge *et al* (forthcoming) note: 'There are two important choices that determine potential motorcycle use: the decision to own a motorcycle, and contingent on that, the decision to use a motorcycle for a particular trip.'

The licensing regime for motorcycles can be a barrier to motorcycle use, and changes to it have coincided with declines in motorcycle use. In 1960, learner motorcyclists were limited to a 250cc solo machine. In 1982, a two-part test was introduced, ahead of a 125cc power-restricted limit on learner motorcyclists. In

1990, learner motorcyclists were required to have successfully passed a Certificate of Basic Training (CBT), before taking a full test on a bike not exceeding 125cc, which then gave the rider an unrestricted motorcycle licence. The requirement to pass the CBT before riding unaccompanied on the road did not apply to learners with an existing provisional motorcycle entitlement acquired under 'grandfather rights' from having passed a car test prior to 1990.

In 1996 the A1 licence restriction was introduced. A learner who passed a test on a 125cc machine was restricted to a motorcycle with a power output not exceeding 25kW for two years. The unlimited category A then applied without any further action required by the rider. At the same time, a regime for direct access to a full motorcycle licence was introduced. This was available to riders over 21, with the test taken on a 35kW machines. More than 50% of tests are now done via direct access (DfT, 2006c). This more recent restriction on motorcycle access has had little discernable effect on the take-up of motorcycling. A history of the motorcycle licensing system can be found in Appendix E.

A third European Driving Licence Directive is currently being negotiated in the European Union. As currently promulgated, this directive would have the effect of introducing a three-tier licensing regime for motorcyclists. To progress to the next licence stage, the rider would be required to take an additional practical test at least two years after having passed the previous one. The age limit for direct access would also be raised to 24. The effect this could have on motorcycling is unknown. The Motorcycle Action Group and the British Motorcyclists Federation argue that one effect could be to discourage young people from taking a motorcycle test as they would be restricted to low power machines that are unsuitable for longer journeys. This could encourage some individuals who may have opted to use a motorcycle to use a car instead, for which no such licensing restrictions are proposed (Baird, 2005).

However, a motorcyclist who has successfully completed a CBT is able to ride on the road unaccompanied, unlike learner car drivers, who have to be accompanied by an experienced driver. This gives the learner motorcyclist a considerable degree of freedom as they are able to experience the utility of private personal transport without being dependent on another person.

It has been historically argued that the cost of ownership and use of motorcycles is less than that of a car. This is reflected in figures from the RAC demonstrating the typical running costs of privately owned (from new) petrol and diesel engine cars covering an average of 12,000 miles a year over three years and motorcycles covering an average of 6,000 miles a year (RAC, 2005). It is also reflected in the lower mileage rates for motorcycles that the Inland Revenue allow to be off-set against tax.

One important factor in choosing a motorcycle is the purchase price, especially for new machines. In general, the cost of a motorcycle is less than for a car, especially one with similar performance.

The fixed costs of ownership of motorcycles vary. The purchase price depends on the model and the performance. Insurance costs also depend on a number of variables. Vehicle Excise Duty rates for motorcycles are dependent on engine size. Current rates of duty for motorcycles are shown in table 10 below.

Engine Size (cc)	Rate of Duty (12 months)
Not over 150cc	£15
151cc – 400cc	£31
401cc – 600cc	£46
Over 600cc	£62

Table 10: Motorcycle Vehicle Excise Duty Rates (2006)

What figures supplied by the RAC do demonstrate is that, even when aggregated across the entire cost of ownership, on a like-for-like basis in terms of performance range, motorcycles are cheaper to own and run than cars. A rough calculation based on nominal 25% depreciation on an £ 8,000 motorcycle covering 6,000 miles a year estimates the total cost of running a 600cc motorcycle is approximately 30 pence/mile. This figure includes costs of protective clothing. For a 125cc scooter costing £ 2,000, the figure falls to 20 pence/mile.

The annualised cost of owning and running a motorcycle varies, but for a medium-priced (£1,800) 125cc scooter covering 6,000 miles a year in London, it is

comparable to the current cost of an annual zone 1-4 travel card (£1,264). This has implications for individuals' modal choice decisions, which are often made in a rational economic manner. If private transport is the same price, or even cheaper, than public transport, there is a powerful incentive to switch. The congestion-beating potential of motorcycles, combined with the convenience of personalised door-to-door travel that is also often quicker than public transport, and available at the user's choice, makes the motorcycle or scooter an attractive modal choice for many.

User Groups

The Integrated Transport White Paper recognised the previous lack of policy and research into the role of motorcycles within the transport mix and indicated the government's intention to establish an advisory group on motorcycling. The advisory group would,

'Allow discussion of issues of concern to those who ride motorcycles and of the ways we can work together on policies, including encouraging further improvements in the safety and environmental impact of motorcycling.'
(DETR, 1998: 41)

The advisory group was established and its terms of reference were to explore:

- a) the safety record of motorcyclists and agree on measures to be taken to improve safety, including general road user behaviour and consideration of training and licensing arrangements;
- b) the environmental impact of motorcycles and to agree what measures, if any, should be taken in light of the conclusions reached by the Group; and
- c) the role of powered two wheelers of all sorts in an integrated transport policy including the scope for traffic management measures that are beneficial to motorcyclists and contribute to that policy.

The Advisory Group's members were: the Motor Cycle Industry Association, the British Motorcyclists Federation, the Despatch Association, the Motorcycle Retailers Association, the Motorcycle Action Group, the Motorcycle Rider Training Association, the Automobile Association, the RAC Foundation, the Local Authority

Road Safety Officers' Association, the Local Government Association and the Association of Chief Police Officers (GAGM, 2004: 75).

The Advisory Group reported to government in 2004, following which the Department for Transport published the Government's Motorcycle Strategy in February 2005 (DfT, 2005a). The implementation of the Strategy is overseen by the National Motorcycle Council, whose membership mirrors the original advisory group.

The White Paper also highlighted many of the issues that had been of concern to motorcyclists' interest groups such as access to bus lanes and provision of secure parking. It also recognised that, while guidance may come from central government, the responsibility of implementation of transport policy rests at a local level.

'In drawing up their local transport plans, local authorities should take account of the contribution that motorcycling can make and consider specific measures to assist motorcyclists, such as secure parking at public transport interchange sites. We would welcome proposals from local authorities interested in conducting properly monitored pilot studies of the use of bus lanes by motorcycles, to help inform decisions on whether there is a case for motorcyclists to be allowed to use bus lanes.' (DETR, 1998: 41)

The reference to the use of bus lanes follows the decision by Bristol City Council to permit motorcycles to use bus lanes on a six-month trial basis from June 1995. This was made permanent in 1996. At the time the White Paper was being prepared other Councils were also considering trials permitting motorcycles to use bus lanes. (BMF, 2005)

In Greater London, consultation between motorcycle user groups and Transport for London is through the London Motorcycle Working Group (LMWG) which was established in 2001. The only public information regarding this group can be found in Proposal 4G.1 of the Mayor's Transport Strategy, which states:

'A London Motorcycle Working Group will be established by Transport for London to include user groups, the police and the boroughs. The group's work will include measures to enhance and extend the provision of parking for motorcycles and mopeds, particularly in areas of high demand. Opportunities will be explored to improve road safety and reduce emissions and noise pollution. It will also review the evidence and if appropriate consider experiments to allow motorcycles to share bus lanes. (*Review of*

bus lanes to be completed by the end of 2001)' (TfL, 2001b: 202. Italics in original.)

The LMWG operates under the Chatham House rule, and its membership, agendas, proceedings and minutes are not made available for public viewing. Although TfL has provided more parking on the Transport for London Road Network, it has been revealed that the LMWG is powerless to advise or put pressure on boroughs over their parking strategies (LMWG, 2005a). All decisions made by TfL with regard to motorcycles are done so with the LMWG having no input into the decision-making process or its members being able to independently review the evidence (LMWG, 2004). The LMWG is perceived by some of its members to be a tokenistic gesture towards motorcyclists and it has lost the confidence of user groups and the police (LMWG, 2005b).

One of the aspects that makes for a sustainable transport system is public confidence in its administrators, which can be reinforced through stakeholder consultation and feedback. As far as motorcycling is concerned it would appear that TfL do not meet this criterion as there is no impression of such dialogue. As Vigar *et al* note, the networks and alliances that hold stakeholders together are essential for efficient spatial management (Vigar *et al*, 2000: 175).

Summary

This section has provided a significant amount of data regarding transport and transport policy, London and motorcycles. The issues that emerge as most significant in establishing the position of motorcycles in a sustainable transport system are: Emissions, Noise, Congestion, Parking and Users' utility and the functioning of the transport system.

The approach that Westminster City Council and Harrow Council have taken towards these issues is examined in the next section, before a broader synthesis of the subject is undertaken in part four.

Part Three

The previous section examined some of the data surrounding transport, transport in London, motorcycles, sustainability and the factors that need to be considered for a sustainable transport system.

One argument that has emerged is that all forms of surface transport modes have their place within the transport hierarchy.

Transport needs within Greater London are not uniform, but depend on a number of factors. These include the location of the starting point and destination of the journey, the purpose of the journey, the journey distance and the specific requirements of the individual traveller.

Greater London is a very amorphous place, and one which developed around the transport network; through the expansion of the road and rail networks in the nineteenth and early twentieth centuries. The urban form was dictated by transport links. Much of what is today's outer London was, until the inter war years, open countryside and still retains a suburban built environment rather than the more urban inner London of the former London County Council. In the London Borough of Harrow, for example, there remains a distinct differentiation between the constituent market towns, each of which have a strong sense of place, and 'London', which many outer London residents regard as being somewhere else.

Although individuals may retain a strong sense of geographic identity (Massey, 1992), many need to travel relatively long distances, especially for work-related trips. The centre of Harrow, for example, is 13 miles from central London. The urban form that London developed into was not only dictated by transport, but now dictates the way that transport operates.

Transport planning in London has traditionally been very central London focused. This is, in part, because transport policy has been controlled from the centre, and in part because most transport links lead to the centre. Radial travel by public transport is relatively straightforward, whereas orbital travel can be problematic and result in disproportionate journey times in relation to the distance travelled. In addition, public

transport accessibility levels are much more uneven, and tend to be lower, in outer London than in inner London.

To attempt to highlight the differences in approach taken by an inner and an outer London borough with respect to transport in general, to sustainable transport and to motorcycles, this section will examine two case studies: the City of Westminster in central London and the London Borough of Harrow in outer London. This section will examine what steps are being taken by these boroughs to achieve a sustainable transport system, and what role motorcycles can play in those systems. The City of Westminster has been chosen as one case study as it has a high concentration of employment, leisure, education and retail activities in an area with a highly developed public transport network. The London Borough of Harrow has been chosen as an example of outer London because it has the second highest concentration of car ownership of any London Borough and, although it is reasonably well served with public transport links to central London and beyond, orbital travel to surrounding areas is more problematic. The London Borough of Harrow is also unique in Greater London insofar as it has no arterial trunk roads, and none of its roads form part of the Transport for London Road Network.

As noted in the earlier section, Transport for London is the highway authority for approximately 550km of London's road network. Transport for London also has operational control of the bus network. It further acts as a traffic authority through its control of traffic lights on all classes of road: the operational base of which is the London Traffic Control Centre in Victoria.

The operational freedom that boroughs have with respect to their transport policies is somewhat limited. Public transport, for example, is supplied either directly or indirectly by Transport for London. The majority of traffic lights, and by extension control of part of the traffic flow, is controlled by TfL. Boroughs' transport strategies need to be in general conformity with the Mayor's Transport Strategy (GLA, 2001b), and funding for most schemes is dependent on a successful bid to TfL. However, boroughs do have the freedom to establish their own parking policies and are also responsible for local road safety strategies. It is these last two elements that will be examined in the case studies.

Westminster

The City of Westminster is in central London, north of the river Thames. It is bounded by the City of London and the London Borough of Camden to the east, the London Borough of Brent to the north and the Royal Borough of Kensington and Chelsea to the west. Part of the City of Westminster is included in the central London congestion charge zone, and a greater part will be included in the western extension to the charging zone, although the extension of the congestion charging zone will not be considered in this case study. Although the City covers a relatively large area and includes some deprived areas in the north of the City, this case study focuses on the central area of Westminster, which includes Soho and the West End. Some of the data on motorcycle parking and use come from a Motorcycle Action Group survey (MAG, 2006a) and are reproduced with permission.

This part of central London is well served by public transport, with seven tube lines passing through Westminster. It also has four main line railway termini, and numerous bus routes that either pass through or terminate in Westminster. In addition, the City of Westminster has the main national coach station at Victoria.

Neither Westminster's Draft Replacement Unitary Development Plan (UDP) (WCC, 2004a) nor the Draft Local Implementation Plan (LIP) (WCC, 2006) give a detailed breakdown of the numbers of people who travel to or through the City of Westminster. What the LIP does note, however, is that the total population of the City is 220,000, while the City provides jobs for 547,000 people (WCC, 2006: 6). In addition to people who come to Westminster to work, the City attracts high numbers of visitors for entertainment and tourism (40% of all London's hotels are in Westminster), shopping and education. Because of its location in the transport network, Westminster also has a significant number of people who travel through the City as part of an onward journey, rather than the City being a destination.

Notwithstanding the high level of public transport provision, the Council notes that:

'The City of Westminster has unacceptably high levels of through traffic and traffic congestion. The problems that this causes include poor air quality and associated illness, a slow and unreliable bus service and large numbers of accidents. The volume of traffic also makes it difficult to provide adequate

facilities for vulnerable road users, such as pedestrians and cyclists.’ (WCC, 2006: 20)

In both the UDP and the LIP, the Council states that it is keen for people who travel in the City to do so by more sustainable modes. The Council notes that these are walking, cycling and public transport, but does not proffer any definition of what constitutes sustainable transport in general. Private discussions with Phil Basher, the then head of transport policy at Westminster City Council, indicate that the Council is of the opinion that neither cars nor motorcycles can make any contribution to sustainable transport in London (Basher, 2006).

The number of vehicles entering central London during the morning peak (0700 – 1000) peaked in 2000 at 1,108,000 and has since experienced a slight decline. The most common mode of transport used to access central London is the Underground and Docklands Light Railway. The modal split of people entering central London is illustrated in figure 21 below. For these purposes the City of Westminster is assumed have the same travel patterns as central London.

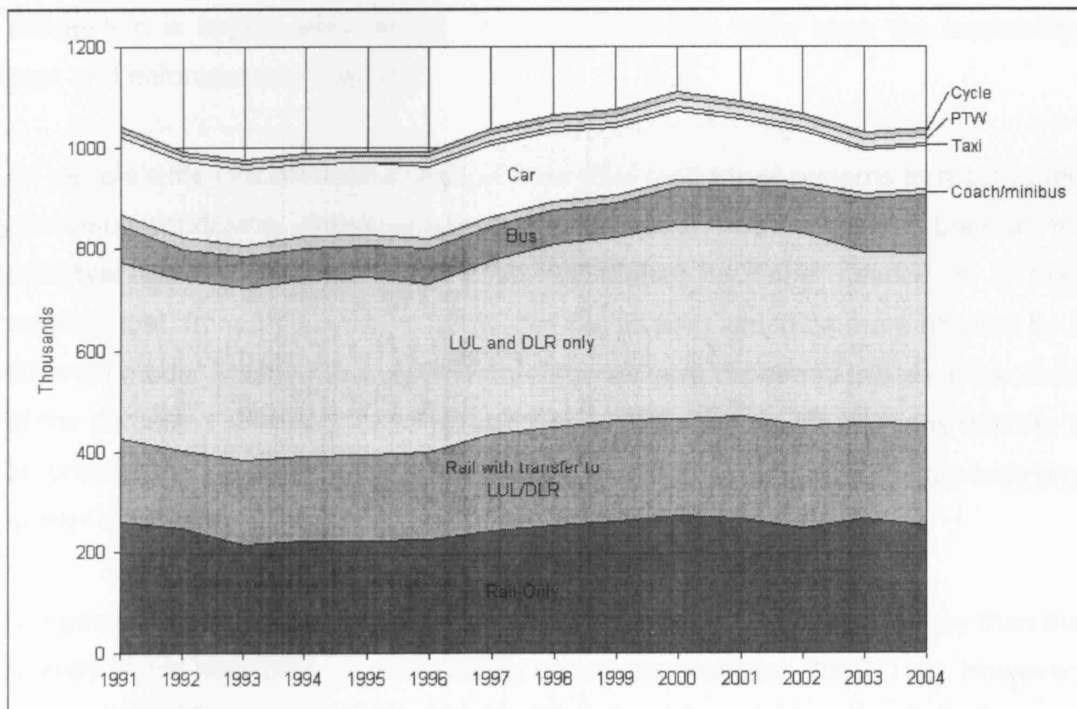


Figure 21: People entering central London during the morning peak

Source: WCC, 2006: 21

Figure 21 above indicates the main mode of people entering central London, but it must be remembered that many of these trips are multi-mode: for example an individual may walk to a bus stop, take the bus to the underground station and then make the onward journey by tube.

It can be seen from figure 21 above that only a minority of trips (approximately 30%) are made by surface modes. Since 2000 it would appear that the increase in bus trips has come at the expense of both car and rail (underground or surface). What the figure does indicate is that the number of trips by car during the morning peak has decreased since 2000, although these figures seem to contradict those supplied by transport for London and shown in figure 4 earlier. The fact that car use in central London has been decreasing since before the introduction of the Congestion Charge indicates that factors other than just the congestion charge need to be taken into consideration.

One factor that may have contributed to the decline in car use in Westminster is the amount of congestion in the central area even before the congestion charge was brought in. As Mannings (2006) and Goodwin (2006) note, to some extent congestion is largely self-policing. Another factor may have been the availability, cost and enforcement of parking.

As people's life circumstances change, they alter their travel patterns to react to the prevalent conditions. Some people stopped using cars in central London for whatever reason was pertinent to them: either they no longer needed to, or they realised that, from a personal point of view, the journey would be more efficient by a different mode. Potential new car drivers may not have chosen to use a car because of the perceived difficulties in using that mode, thus effecting the changes that are a by-product of 'churn' predicted by Goodwin (2004) without the need to introduce any further measures.

Congestion is calculated as the additional time spent on a particular journey than the journey would have taken in free-flowing conditions (Banister, 2005: 112). However, as Livett (2007) argues, congestion is a function of road capacity, the volume of traffic and the number of impediments. An impediment can be considered to be anything that hinders the free flow of traffic, be it a stationary (parked) vehicle, a bus picking up passengers at a built-out bus stop, traffic lights, slow moving vehicles or even inclement weather. As Mannings (2006) and others have noted, much of the

increase in congestion in central London prior to the introduction of the congestion charge can be attributed to an increase in the number of impediments through the alteration of traffic light phasing or the introduction of new bus lanes, which serve to reduce road capacity.

As noted above, the overall position taken by Westminster City Council is that travel to, and even within, the City by means other than public transport, cycling or walking is inherently unsustainable and to be discouraged. As part of this approach, the Council is also considering methods to attempt to reduce unnecessary short public transport journeys when walking would be a more suitable alternative (WCC, 2004b: 10).

In the MAG survey, the majority of respondents indicated that they used their motorcycles for work-related or entertainment-related reasons. This is illustrated in figure 22 below, and demonstrates that motorcyclists have a role to play in the efficient working of the economy of the City of Westminster, which has been identified as one of the strands of a sustainable transport system.

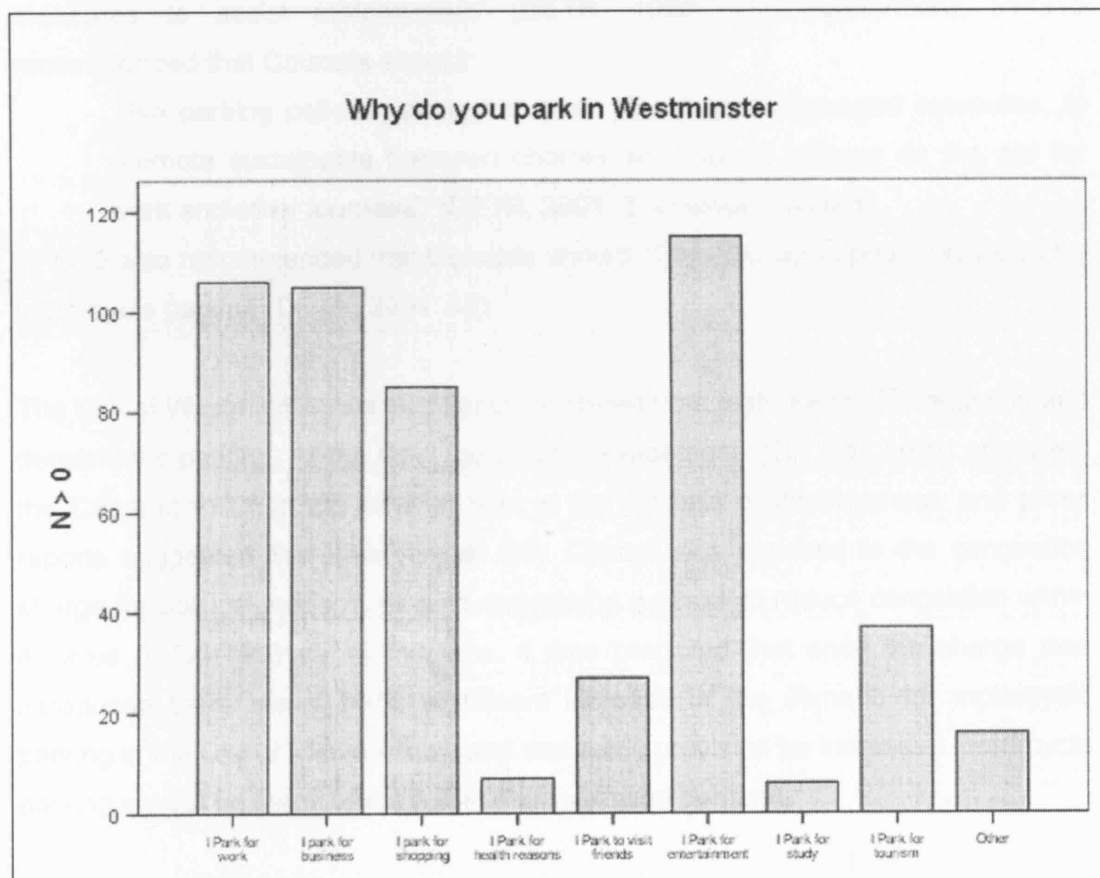


Figure 22: Reasons for using a motorcycle in Westminster
Source: MAG, 2006a: 18

Parking

One of the techniques that the City Council uses to discourage private transport in and to its area, and by extension to promote more sustainable modes, is parking restraint. This is in line with the recommendations of PPG 13 (DTLR: 2001), which required that local authorities have transport and development plan policies that were complimentary and consistent with their overall strategy on planning and transport. PPG13 also suggested that planning authorities should use parking policies, amongst others, to promote sustainable transport.

The first draft of the City of Westminster Replacement Unitary Development Plan (WCC, 2001a) made no reference to motorcycles other than to the location of minicab and courier offices (Policy SS14). By doing so, the council effectively ignored the advice given in the Transport White Paper that: 'Local authorities should take account of the contribution that motorcycling can make and consider specific measures to assist motorcyclists' (DETR, 1998: 41). Furthermore, PPG13 recommended that Councils should:

'Use parking policies, alongside other planning and transport measures, to promote sustainable transport choices and reduce reliance on the car for work and other journeys.' (DETR, 2001: 3, emphasis added)

PPG13 also recommended that Councils should: 'Consider appropriate provision for motorcycle parking (DETR, 2001: 15).

The City of Westminster has traditionally suffered from high levels of congestion and demand for parking. At the time the Draft Replacement UDP was being prepared, the Congestion Charging scheme was in the process of development, and press reports suggested that Westminster City Council was opposed to the congestion charge for political reasons, despite expressing a desire to reduce congestion within its area (WCC, 2001a). At the time, it was predicted that once the charge was introduced there would be a significant increase in the demand for motorcycle parking in the City of Westminster, and that some provision for increased motorcycle parking should be made to cope with this increased demand.

The second draft of the Replacement UDP introduced policy TRANS11A which read:

'The City Council will seek to maintain an adequate supply of parking facilities for motorcyclists and will consider motorcyclists needs in the design of any traffic calming and management schemes. In recognising the safety and environmental problems caused by motorcycles relative to other modes, it will be necessary to apply a level of restraint through parking policies.'
(WCC, 2002: Policy Trans11A)

During the Public Inquiry into the Draft Replacement UDP, the Motorcycle Action Group (MAG, 2002) and the Motorcycle Industry Association (MCIA, 2002) argued that this new policy was not adequate to meet the growing demand that changes in traffic modes required, given the expected growth in motorcycle use following introduction of the congestion charge in 2003. Both groups were of the opinion that the words 'seek to' should be removed from the policy, in an attempt to bind the Council to a commitment to make available sufficient parking capacity to meet reasonable demand. Craig Carey-Clinch, for the MCIA argued that:

'By discouraging the mode through parking policies, significant access, security and safety issues will be added to this already vulnerable mode. PTWs are not cars and should not be treated as such' (MCIA, 2002: 50).

In evidence for the Council, Sean Dwyer affirmed the position that it was the Council's policy to discourage travel to Westminster by private transport and it was attempting to achieve this through demand management of parking facilities. The Council also sought to discourage motorcycle use for reasons of road safety, noise and air quality (Dwyer, 2002).

In his report on the Public Inquiry, the Inspector noted that:

'Policy TRANS 11A was introduced by the LPA (Local Planning Authority) in order to meet the many objections voiced by the Motorcycle Action Group (MAG) (*et al*). To a large extent, the objections have been met by the additional policy which, in essence, recognises the growing importance of PTW (powered two-wheeled) vehicles as a mode of travel. The policy commits the LPA to maintaining adequate parking facilities and to bear in mind the needs of such vehicles in traffic management. (...) I detect a slight ambivalence in the LPA's attitude to increased PTW use since it has misgivings relative to such vehicles' safety record and noise levels. (...) I very largely share the concerns of the LPA with regard to road safety, increased noise levels and the perceptible dangers of a significant modal

shift away from walking, cycling and the use of public transport in favour of increased PTW use. I accept the LPA's evidence regarding levels of pollution and consider that the key comparison is not between private cars and PTWs but between the latter and buses. (WCC, 2004c: 337-338)

The Inspector accepted the Council's arguments (WCC, 2004c) and the Policy was carried forward to the Plan scheduled for adoption (WCC, 2004a).

As part of their position that, for their area, motorcycles did not represent a sustainable transport mode, the Council operated a demand restraint mechanism. By restricting the availability of parking the Council were aiming to reduce the numbers of motorcycles entering their area, notwithstanding the opinion expressed in the Mayor's Transport Strategy that in areas of high demand more motorcycle parking should be provided (GLA, 2001b: 201). As noted in the previous chapter, it has been observed that motorcycle bays in central London were over-subscribed (Tilly, 2003), and were likely to become more so.

This presents a conflict of two aspects of sustainability. In terms of environmental sustainability, a policy that aims to reduce environmental pollution should be welcomed. In an area so well served by public transport there should be no need for visitors to come to Westminster by private transport. In terms of social sustainability and individual mobility this approach places considerable restraints on motorcyclists' access to Westminster. In terms of CO₂ emissions, as noted earlier, motorcycles contribute significantly less than cars, although they do perform less well than other vehicles for other pollutants (GAGM, 2004). However, as the Government's Motorcycling Strategy noted, the priority for improving air quality needs to be focussed on more significant sources of pollution (DfT, 2005a: 12).

Westminster's stance on motorcycle parking has come under heavy criticism from users (MAG, 2006a) and the All Parliamentary Group on Motorcycling (Alam, 2005). The oversubscription of motorcycle parking bays in central London can leave many motorcyclists with little alternative but to make room to park an extra vehicle. This is sometimes achieved by physically moving smaller, lighter motorcycles closer together to create enough space in a practice euphemistically referred to as, 'weeding the scooters' (MAG, 2006a: 8). An example of the results is illustrated in figure 23 below.



Figure 23: Scooters parked at maximum capacity

A parking beat survey conducted by Ian Parfitt of the Motorcycle Acton Group in October 2004 (reproduced as Appendix A in MAG, 2006a) identified that many of the existing bays in Westminster were either full or oversubscribed. At the time of the survey, he identified that there were 2169 motorcycles parked in bays, with 122 empty spaces. This represented an occupancy rate of nearly 95%. He also noted that there was scope for expanding existing bays to accommodate a further 420 motorcycle parking spaces. The survey did not include those bikes that were parked outside of bays. Although this survey represents a snap-shot on only one day, it is indicative of the motorcycle parking situation in the City of Westminster. This compares with an average 65% occupancy for car parking spaces (WCC, 2006: 358).

According to Westminster City Council:

'There has been a notable increase in motorcycling since the Mayor of London introduced the Central London Congestion Charge Zone as these vehicles do not pay the daily weekday charge of £8. Since the introduction of the congestion charge there has been a 12% increase in the number of motorcycles entering the zone during the charging hours.

'This has led to an increase in demand for motorcycle parking in some parts of the City of Westminster. At popular destinations in the City, such as the West End, demand significantly exceeds supply which can lead to disputes about parking and, on occasions, vehicle damage.' (WCC, 2006: 28-29)

According to user groups, there is dissatisfaction about the level of motorcycle parking in Westminster, illustrated in figure 24 below.

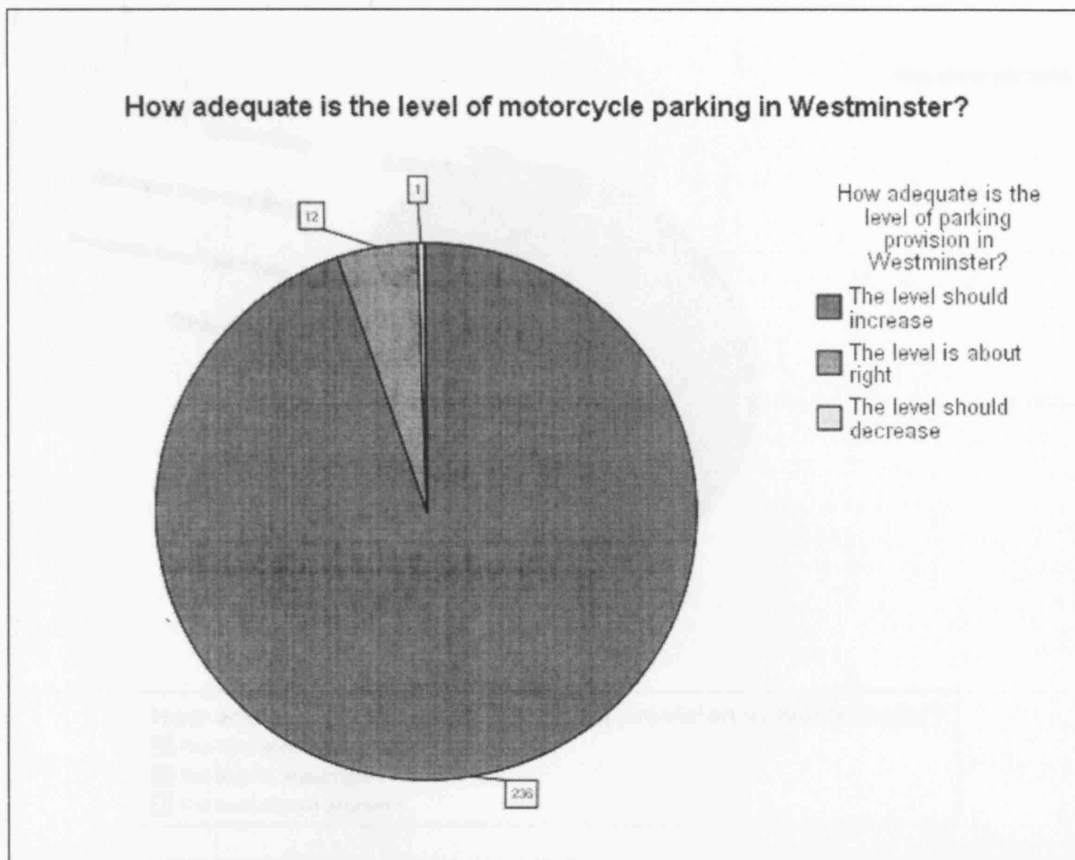


Figure 24: Satisfaction with the level of motorcycle parking in Westminster

Source: MAG (2006a: 16)

One common complaint by motorcycle users is that the available motorcycle parking becomes heavily subscribed from early in the day. This is reflected in the survey, which indicated that there was a significant relationship between the time of arrival at a parking bay and satisfaction with the level of parking. This relationship is illustrated in figure 25 below.

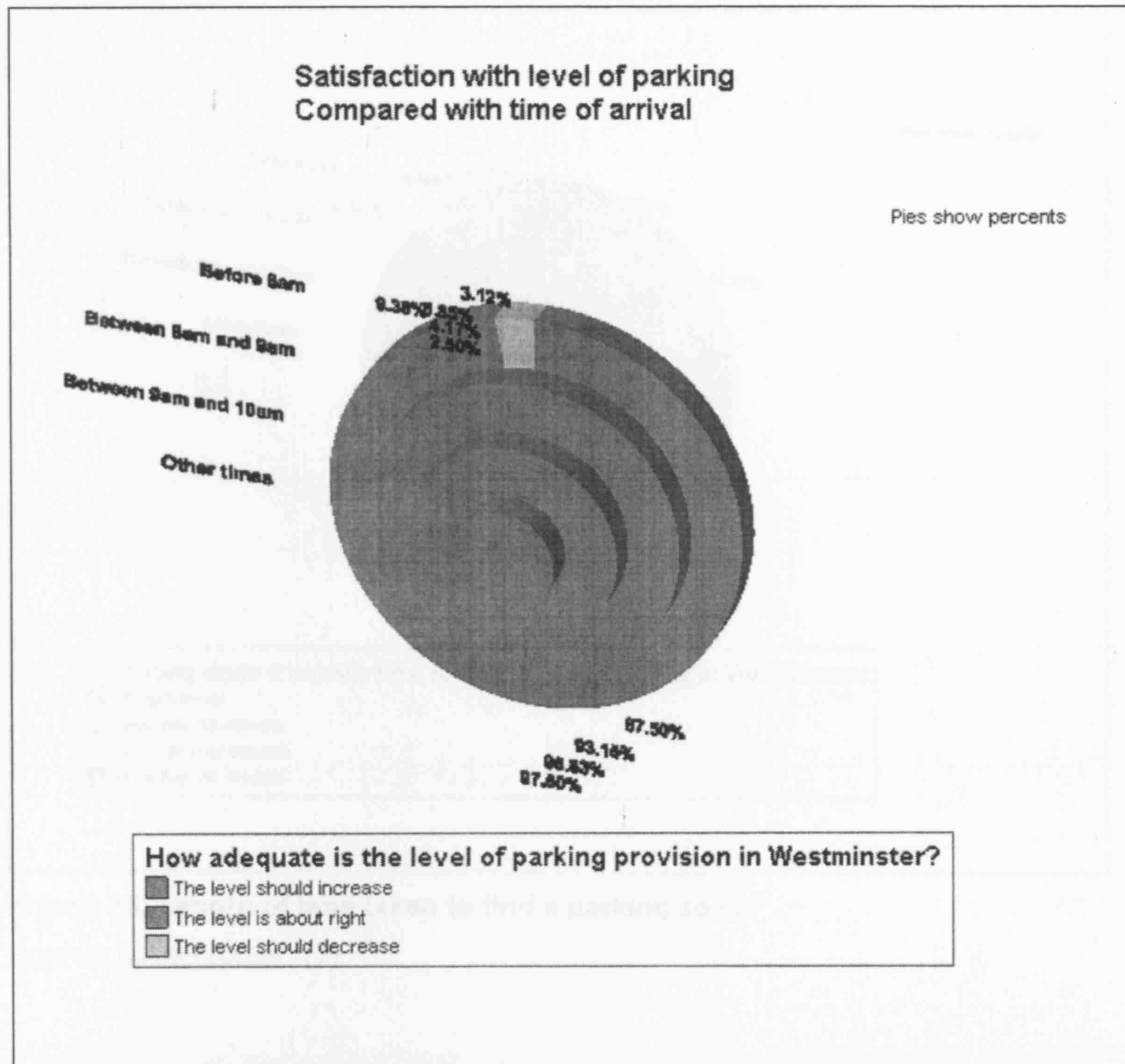


Figure 25: satisfaction with level of parking provision and time of arrival

Source: MAG (2006a: 16)

This is also reflected in the amount of time respondents declared it took to find a parking space compared with time of arrival, as illustrated in figure 26 below. There was also a greater preference for the provision of short-term bays among respondents who did not park in Westminster all day (MAG, 2006a: 18).

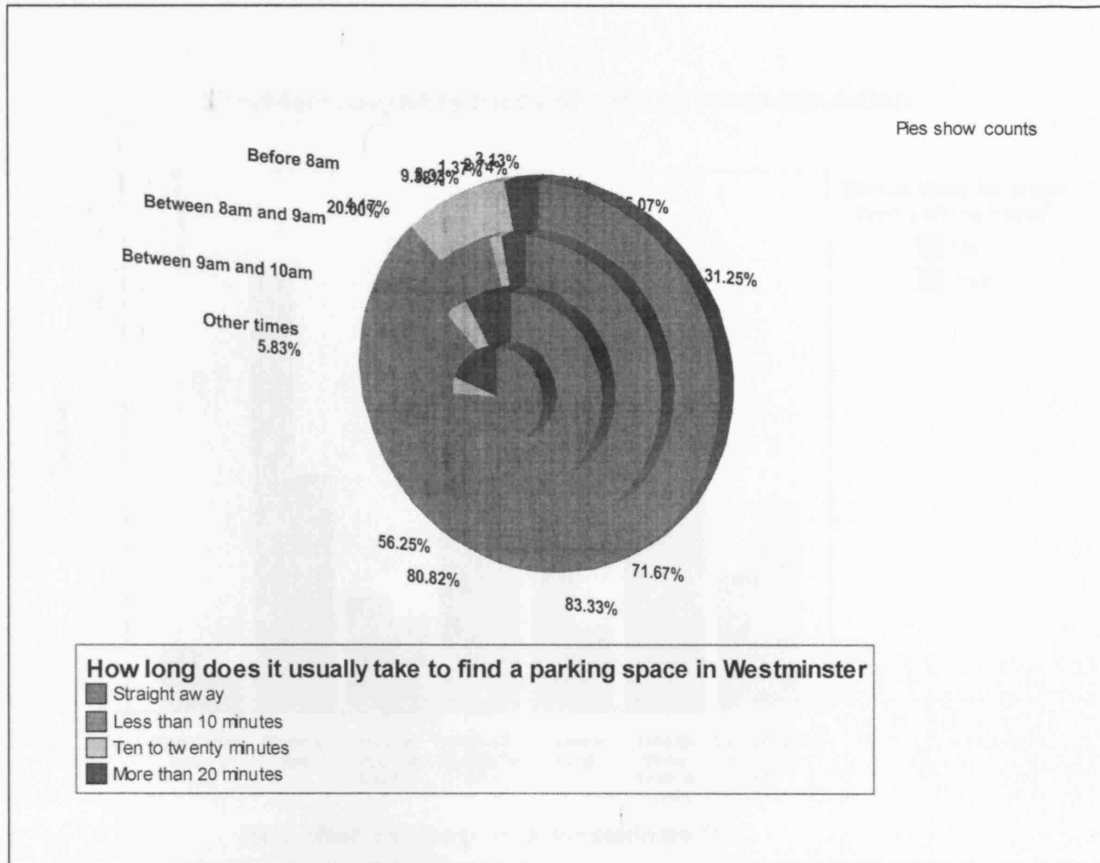


Figure 26: Length of time taken to find a parking space

Source: MAG (2006a: 17)

One complaint expressed in the MAG survey was that visitors who arrive later in the day or who only need to park for a short time find it difficult to find a space because the available parking is fully occupied by all day users. Observational analysis reveals that there is movement in and out of parking bays during the day but that this movement is limited. Although a majority (55%) of respondents were not in favour of short-term bays, there was a greater preference for them from occasional visitors to Westminster. This is illustrated in figure 27 below.

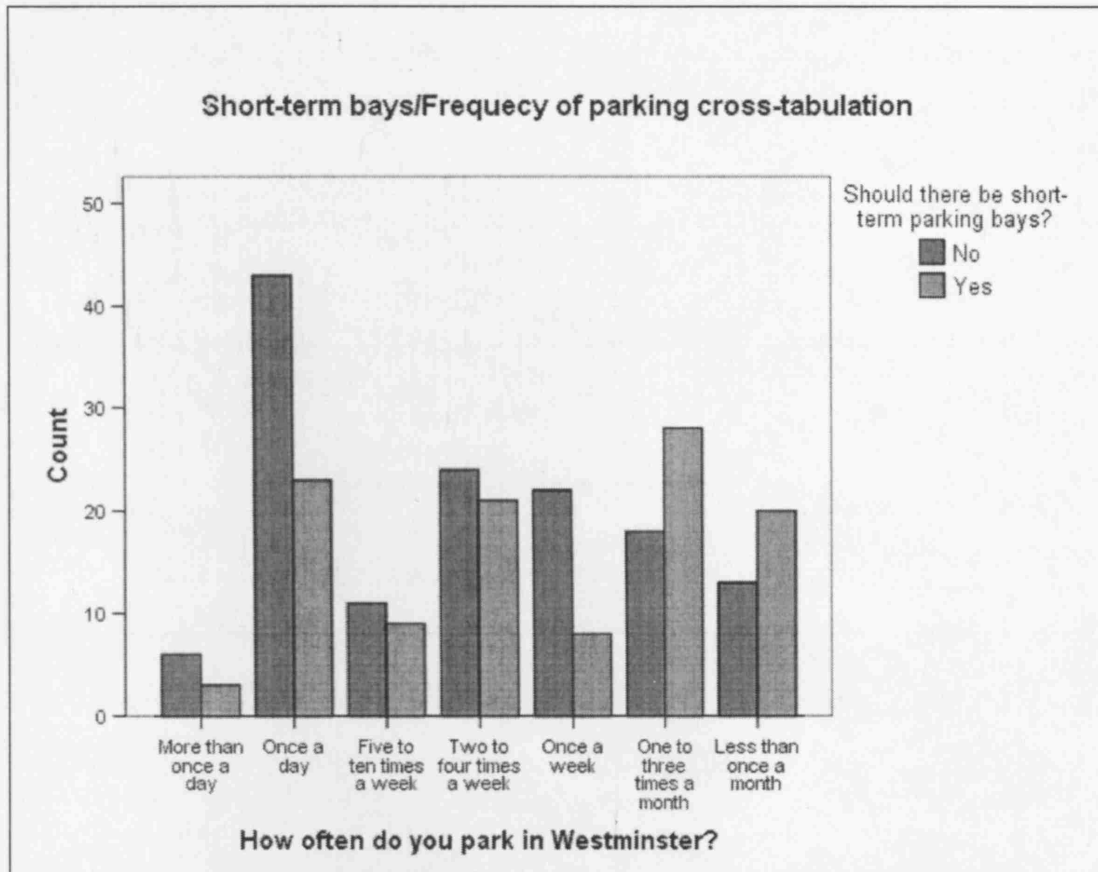


Figure 27: Demand for short-term motorcycle parking

Source: MAG (2006a: 17)

The City Council is currently reviewing its motorcycle parking policy (WCC, 2006: 29). Among the options that the Council is considering is the concept of paid-for on-street motorcycle parking (WCC, 2006: 360). As noted in the earlier section, the provision of on-street motorcycle parking facilities, whether secure or not, costs approximately £2,500 for the relevant Traffic Management Order. While parking bays remain free of charge to the end user, this is a cost that the Council has to budget for, either from internal resources or via a funding bid from Transport for London.

In an experiment in 2001/2, whereby secure paid-for motorcycle parking facilities were provided, there was a poor take-up of the security facilities. The parking bays themselves were undersubscribed, possibly because of the availability of free (and unsecured) facilities nearby, and only a minority of motorcyclists were observed to use the security measures (railings that allowed a user to chain a motorcycle to a physical object) provided. This experiment was abandoned in 2002 following the

poor take-up of the scheme. However, the Council is once again considering introducing paid-for motorcycle parking. The Council note that:

'In the past the Council has always considered that the "trade-off" for motorcyclists in having to pay to park on-street was the provision of security facilities. However, experience has shown that when these are provided they are generally ignored by motorcyclists. In this case it is felt given the volume of requests for additional motorcycle parking spaces that the "trade-off" should be the provision of more on-street bays' (WCC, 2006: 360-361).

The notion of charging for individual parking bays is not popular among users. The MAG survey revealed that only a minority of respondents would be willing to pay for individual bays. As one respondent noted: 'If bikes were subject to a congestion and parking charge I would use my car. There has to be an upside to arriving wet and covered in traffic grime.' (MAG, 2006a: 48) The unpopularity of the proposal increased the more frequently the user parked in Westminster. This is illustrated in figure 28 below.

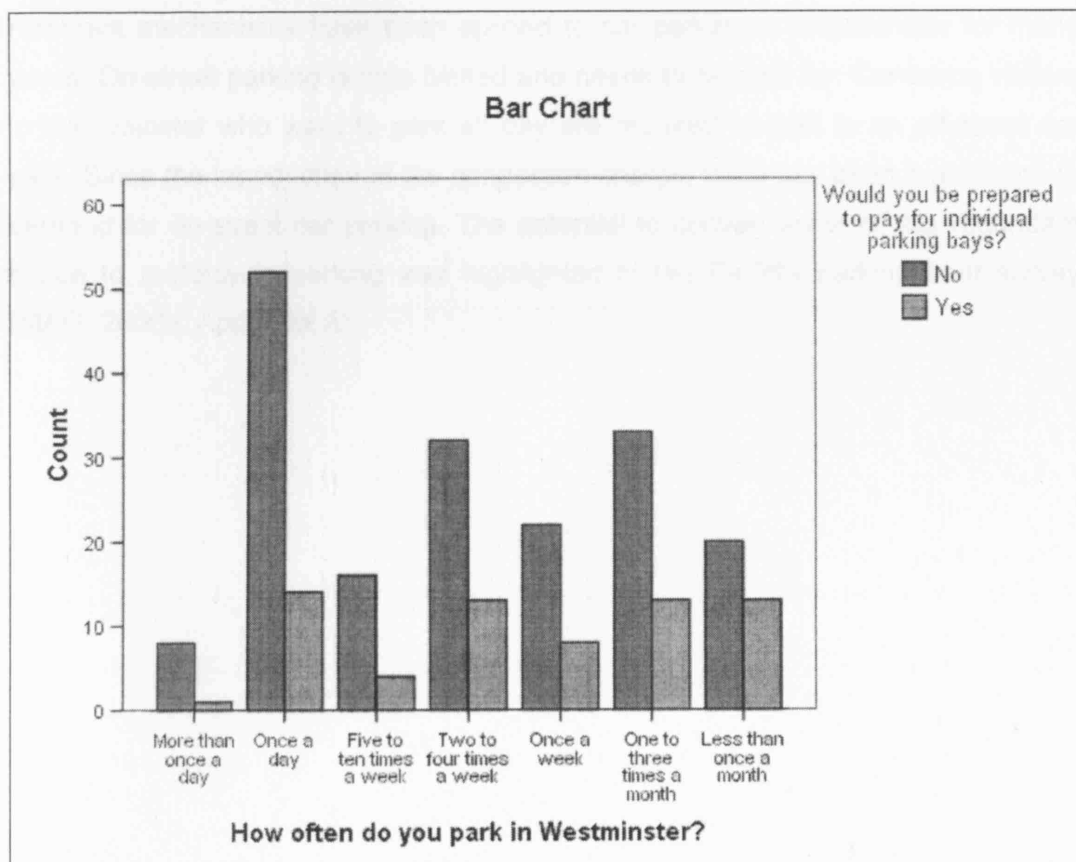


Figure 28: Willingness to pay for individual bays

Source: MAG survey

What has emerged from the Council's examination of motorcycle parking in Westminster is that, at present, the existing motorcycle bays are not designated as such by any traffic management order. In effect they are free parking, and could theoretically be used by any vehicle without fear of penalty. Irrespective of the outcome of their review of motorcycle parking, the Council has expressed a commitment to regularise these existing bays (WCC, 2006: 361).

However, as Westminster City Council notes, there is limited kerb space available for parking, and this space needs to be allocated to suit a variety of needs, including parking, loading, bus-stops, general pedestrian access and preserving the integrity of the public realm (WCC, 2004a). If reallocation of kerb space to motorcycle parking were to take place, this would have to be at the expense of other uses. Any increase in motorcycle parking provision could have the effect of increasing motorcycle use in Westminster, which the Council regards as an unsustainable mode given its central London location.

Restraint mechanisms have been applied to car parking in Westminster for many years. On-street parking is time limited and needs to be paid for. Car-borne visitors to Westminster who want to park all day are required to park in an off-street car park. Since the introduction of the congestion charge, there has been a reduction in demand for on-street car parking. The potential to convert some of this redundant space to motorcycle parking was highlighted in Ian Parfitt's parking beat survey (MAG, 2006a: Appendix A).

Road Safety

In line with national requirements, the City of Westminster has set a road casualty reduction target of 40% of motorcyclists killed or seriously injured compared to the 1994-1998 baseline. This represents a reduction from 47 to 28 (WCC, 2006: 302). These numbers are relatively small, which makes statistically significant comparisons difficult, especially with respect to fatalities. The 1994-1998 average for motorcycle fatalities was 0.2. Between 1990 and 2004, nine motorcyclists were killed on Westminster's roads, compared to a total of 228 fatalities for other modes in the same period. These figures are shown in table 11 below

Year	Total KSI (fatal)	PTW KSI (fatal)	PTW KSI as proportion of total
1990	551 (19)	71 (0)	13%
1991	501 (26)	55 (1)	11%
1992	486 (17)	44 (1)	9%
1993	454 (14)	60 (1)	13%
1994	480 (14)	54 (0)	11%
1995	325 (16)	38 (0)	12%
1996	374 (16)	49 (1)	13%
1997	373 (16)	60 (0)	16%
1998	420 (9)	48 (0)	11%
1999	347 (12)	52 (1)	15%
2000	373 (19)	68 (2)	18%
2001	360 (15)	54 (0)	15%
2002	321 (15)	51 (0)	16%
2003	330 (11)	58 (2)	18%
2004	272 (9)	38 (0)	14%

Table 11: Casualty numbers in Westminster

Source: WCC, 2006

The Government's National Motorcycle Strategy (DfT, 2005a) and other documents note that motorcyclists comprise approximately 20% of all road casualties, despite their small numbers. As can be adduced from these figures, motorcyclists comprise a smaller proportion of road casualties in Westminster than elsewhere in the country.

The total number of motorcycle casualties for the years 1990 to 2004 are shown in figure 29 and table 12 below.

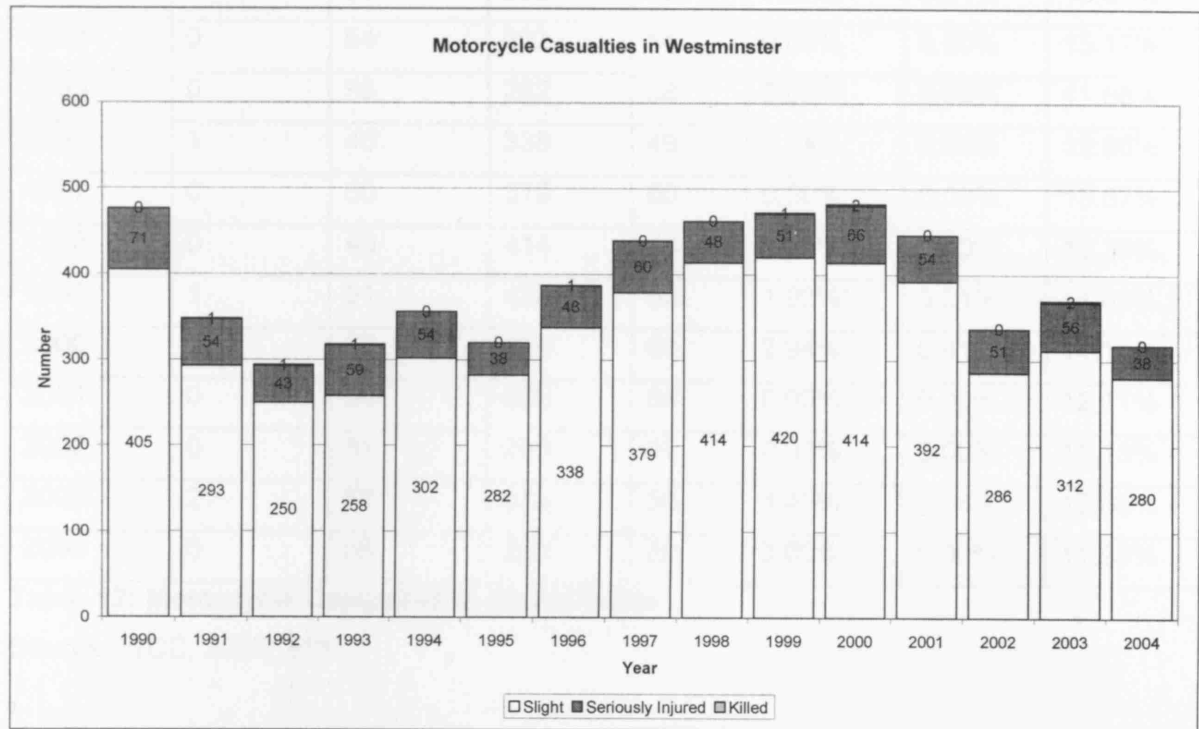


Figure 29: Motorcycle Casualties in Westminster

Source: WCC, 2006: 316

Year	Killed	Seriously Injured	Slight	KSI	Severity Proportions		
					Fatal of KSI	Fatal of All	KSI of All
1990	0	71	405	71	0.00%	0.00%	14.92%
1991	1	54	293	55	1.82%	0.29%	15.80%
1992	1	43	250	44	2.27%	0.34%	14.97%
1993	1	59	258	60	1.67%	0.31%	18.87%
1994	0	54	302	54	0.00%	0.00%	15.17%
1995	0	38	282	38	0.00%	0.00%	11.88%
1996	1	48	338	49	2.04%	0.26%	12.66%
1997	0	60	379	60	0.00%	0.00%	13.67%
1998	0	48	414	48	0.00%	0.00%	10.39%
1999	1	51	420	52	1.92%	0.21%	11.02%
2000	2	66	414	68	2.94%	0.41%	14.11%
2001	0	54	392	54	0.00%	0.00%	12.11%
2002	0	51	286	51	0.00%	0.00%	15.13%
2003	2	56	312	58	3.45%	0.54%	15.68%
2004	0	38	280	38	0.00%	0.00%	11.95%

Table 12: Motorcycle Casualties in Westminster

Source: WCC, 2006: 316

The severity proportion is the ratio of all injury collisions that involve a serious injury or fatality. Research by Broughton and Buckle (2005) of the Transport Research Laboratory indicates that while road traffic casualties are falling for all classes of vehicle, the national trend is that the severity proportion is increasing. This means that although fewer injury collisions are occurring, the chances of an individual involved in a collision being killed or seriously injured is increasing. This is in spite of more secondary safety measures being introduced in cars. Broughton and Buckle's research supports the hypothesis put forward by John Adams (1985) that there may be an element of risk compensation at work, insofar as drivers compensate for the increased safety protection through engaging in riskier driving strategies.

Although secondary safety measures are not generally fitted to motorcycles, the severity proportion of motorcycle casualties is also increasing. The national severity proportion for 1994 to 2004 is shown in figure 30 below, and the severity proportion

for Westminster is shown in figure 31 below. This period has been selected as it represents the start of the period against which road traffic casualty reduction targets are measured, and it coincides with the increase in motorcycle use.

As Broughton and Buckle (2005) note, the increase in secondary safety measures in cars has seemingly led to an increase in riskier driving strategies. This can have the effect that vulnerable road users, including pedestrians, cyclists and motorcyclists, are at greater risk of injury. Broughton and Buckle also note that the mass distribution of the UK car fleet has changed in recent years, with more larger (sports utility and multiple people vehicles) and smaller (compact and super-mini) cars being purchased at the expense of medium-sized saloons. In their analysis of the data they have concluded that this change in the mass distribution has resulted in a 1% increase in road traffic casualties when all other factors have been taken into account (Broughton & Buckle, 2005: 26).

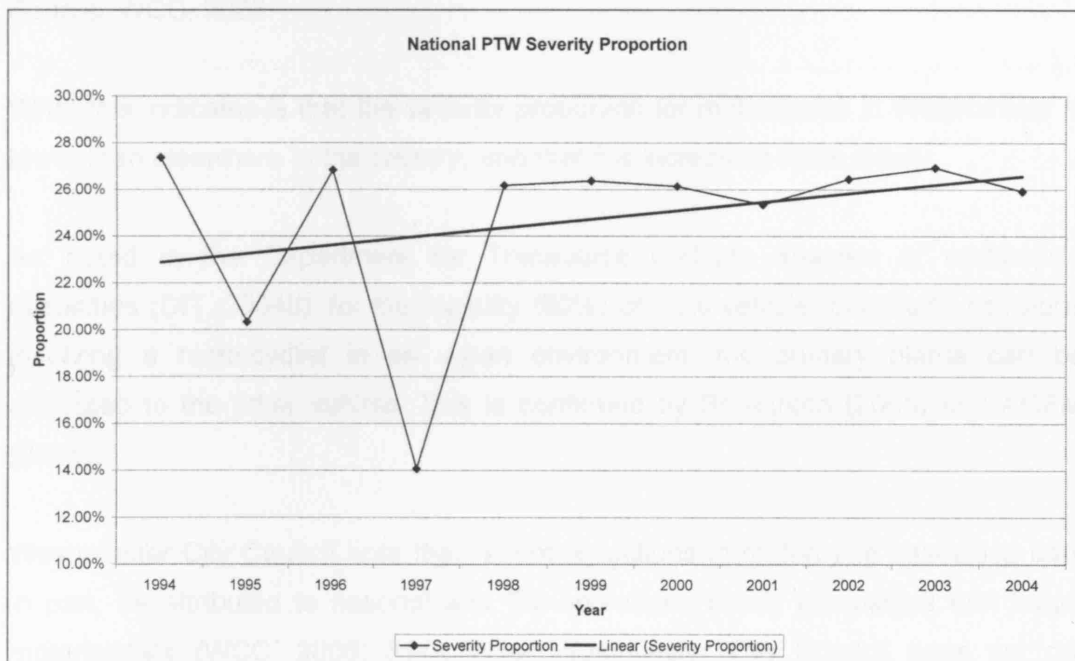


Figure 30: National motorcycle severity proportions

Source: DfT, 2006b

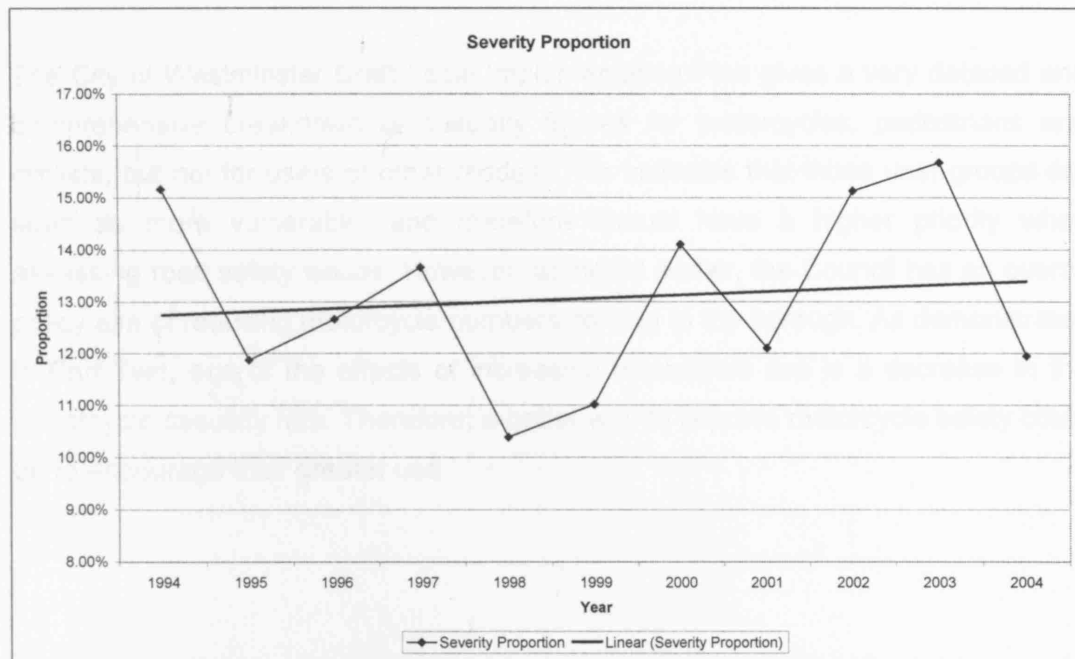


Figure 31: Motorcycle severity proportions in Westminster

Source: WCC, 2006

What this indicates is that the severity proportion for motorcycles in Westminster is lower than elsewhere in the country, and that it is increasing more slowly.

As noted in the Department for Transport's in-depth analysis of motorcycle casualties (DfT, 2004d), for the majority (60%) of multi-vehicle road traffic collisions involving a motorcyclist in an urban environment, the primary blame can be attributed to the other vehicle. This is confirmed by Broughton (2005) and ACEM (2004).

Westminster City Council note that recent reductions in motorcycle casualties can, in part, be attributed to national and TfL sponsored safety campaigns that target motorcyclists (WCC, 2006: 314). What Westminster City Council does not do, however, is note the effect of safety campaigns aimed at car drivers – the transport mode that user groups claim pose the greatest risk to motorcyclists (MAG, 2005a).

The only motorcycle-specific road safety measure proposed in the Draft Local Implementation Plan is the trial use of eight of Westminster's bus lanes by motorcycles (WCC, 2006: 314). This trial is on-going, but Transport for London have withdrawn their funding of the monitoring of the results, meaning that the outcome may be inconclusive (Duckham, 2006).

The City of Westminster Draft Local Implementation Plan gives a very detailed and comprehensive breakdown of casualty figures for motorcycles, pedestrians and cyclists, but not for users of other modes. This indicates that those user groups are seen as more vulnerable, and therefore should have a higher priority when assessing road safety issues. However, as noted earlier, the Council has an overall policy aim of reducing motorcycle numbers coming to the borough. As demonstrated in Part Two, one of the effects of increasing motorcycle use is a decrease in the motorcycle casualty rate. Therefore, a better way to improve motorcycle safety could be to encourage their greater use.

Summary

In this case study, it has been demonstrated that the City of Westminster attempts to promote cycling walking and public transport, which it considers to be more sustainable forms of transport through techniques of demand management by placing restrictions on the levels of parking for both cars and motorcycles. For cars, demand for parking is also managed through the price mechanism. At present, the Council is considering introducing parking charges for motorcycles, partly to offset the cost of providing parking facilities, and partly to reduce motorcycle use, which it regards as unsustainable. Motorcycle users are reluctant to pay for parking facilities. As noted in responses to the MAG survey, users regard the phasing out of free motorcycle parking as a major disincentive to using a motorcycle.

In terms of road safety, motorcycle use is becoming safer in Westminster as motorcycle use increases, although the severity proportion is increasing. The casualty rate for motorcycles is lower than elsewhere in the UK, as is the severity proportion; and the severity proportion is also increasing more slowly.

The City Council has attempted to address motorcycle casualties through the introduction of experimental use of bus lanes by motorcycles, although funding for the analysis of the data collected has been withheld by TfL.

To promote greater motorcycle use in Westminster, the Council would need to provide more free parking facilities. However, this would be contrary to the Council's stated aims of reducing private motorised transport, and would have a cost implication.

London Borough of Harrow

In contrast to the City of Westminster, where the majority of journeys are made by means other than by the car, the London Borough of Harrow has the second highest levels of car ownership and use in Greater London.

The London Borough of Harrow is located in north-west London. It has reasonable transport links with central London, with three national rail lines and four London Underground lines serving the borough. There are no trunk or Transport for London roads within Harrow, although there are several London distributor roads which operate on a north-south and east-west basis.

The borough is largely characterised by a pattern of suburban growth that emerged with the Metropolitan Railway. An examination of historic maps reveals that much of the borough was still undeveloped until the 1930's. The Borough's housing stock is characterised by semi-detached dwellings with gardens in a form of development that was promoted by the Metropolitan Railway as 'Metroland.'

There are fewer data available for the outer London boroughs as they have not been as well studied as inner London. Figures for motorcycle use and the attitudes of motorcyclists are more problematic to obtain, especially as levels of motorcycle use within the outer London boroughs are lower than in central London.

Car ownership in Harrow, with 77% of households having one or more cars, is the second highest in Greater London (after the London Borough of Hillingdon). It is also higher than in England and Wales as a whole, where average car ownership levels are 73%. Harrow also has the second highest percentage of households owning two or more cars (at 33%).

Approximately 50% of Harrow residents in employment travel to work by car or van – compared to 36% for London as a whole – and smaller proportions of residents use public transport or walk compared to the rest of London. This is illustrated in table 13 below.

Mode	Harrow	Greater London
Car or van	50%	36%
Train or underground	25%	31%
Bus	7%	11%
Walk	6%	8%
Other	12%	14%

Table 13: Modal shares of work-related trips in the London Borough of Harrow

Source: Harrow, 2006: 13

According to the Local Implementation Plan, 'As a result of this [extensive car use], encouraging drivers to change their mode of transport to a more sustainable form of transport is extremely challenging' (Harrow, 2006: 13). As with Westminster City Council, neither the Harrow Unitary Development Plan (Harrow, 2004) nor their Local Implementation Plan (Harrow, 2006) give a definition of sustainable transport mode. Unlike for Westminster, both of these documents recognise that the motorcycle is a more sustainable mode than the car, and the council has adopted a number of passive policies to facilitate motorcycle use. Additionally, the Council has adopted a number of parking policies aimed at mitigating the high levels of car use in the borough.

Trip patterns within the London Borough of Harrow are also different than in central London. There is a higher proportion of trips within the borough or to take residents out of the borough to another part of London than for central London, where the majority of trips have their origin outside of that area (WCC, 2006; Harrow, 2006; TfL, 2006).

Parking

One of the Council's parking policies is its maximum car parking standards for new development, including residential development. At present, the UDP allows for a maximum of 1.5 car parking spaces for each new dwelling, although many of the semi-detached and detached homes have sufficient forecourt parking for at least one, and often two or more cars. In the more densely populated parts of the borough, and especially areas near transport interchanges and underground

stations on-street parking is controlled. In these areas, residential conversions from houses to flats generally have a restriction prohibiting the occupiers of sub-divided dwellings from obtaining residents parking permits. This resident parking restriction is enforced through the relevant traffic management orders. In those parts of the borough that are not covered by controlled parking zones, there is generally ample on-street parking. The City of Westminster, by contrast, is entirely covered by controlled parking zones, with no unrestricted car parking available on public land.

The ready availability of car parking in Harrow has helped to facilitate both car ownership and car use in a way that is not possible in inner London. The resident population of borough also has different characteristics, with a higher proportion of families with children, who are more likely to own and use cars (DfT, 2006a) than in central London.

When the Council considers planning applications for non-residential development, parking standards are judged on each application according to its merits, but should also have regard to the needs of parking for motorcyclists. This is in addition to a requirement to consider convenient and secure parking for bicycles, and the provision of showers and changing facilities for cyclists (Harrow, 2006: 353).

According to the Local Implementation Plan:

‘Depending on the nature of the development, motorcycle parking spaces should be provided for staff and visitors. As a guideline, 1 motorcycle parking space should be provided per 20 car parking spaces, subject to all developments with more than 10 car spaces having a minimum of 1 space. A minimum area of 2m x 1m should be provided, and, as with pedal cycle parking, every effort should be made to provide spaces in a secure, and attractive position. The provision of cycle parking is an essential component of the Council's policies of encouraging cycling and sustainable transport. They should be located closer to the building they serve than car parking spaces, and should be provided with adequate protection from the weather.’
(Harrow, 2004: Schedule 5 and Harrow, 2006: 407)

Although the adoption of such a policy by the Council would serve to assist motorcyclists, its implementation is dependent on the recommendations put to the development control committee by the appropriate planning officers. Private discussions with planning officers reveal that they are not aware of this requirement

with regard to motorcycle parking and therefore do not insist that it be adhered to (Pidgeon, 2006).

Motorcycles are generally exempt from parking restrictions in Harrow. They are permitted to park in residents' bays without the need for a residents' permit, and in the town centres free motorcycle parking bays are provided. These bays are generally undersubscribed.

Although a significant minority of people who work in Harrow travel from outside the borough, trip characteristics in Harrow are different from those in Westminster. The availability of car parking facilitates the use of that mode possibly at the expense of motorcycle use.

The Council has recently proposed introducing a £2 daily charge for users of the Civic Centre car park in an attempt to promote the use of more sustainable transport modes. Motorcycle parking will remain free of charge, and showers and changing facilities for cyclists and motorcyclists will be provided (information from internal Council documents). It remains to be seen what effect this will have on motorcycle use by employees of the Council.

Road Safety

The London Borough of Harrow's Local Implementation Plan (Harrow, 2006) does not give as comprehensive a breakdown of motorcycle casualty numbers as the City of Westminster's. They note that their target for motorcycle casualty reduction is from 12 motorcyclists killed or seriously injured (the 1994-98 baseline) to 7 by 2010 (Harrow, 2006: 318).

Part of the difficulty in assessing whether targets have been met is that the numbers being dealt with are relatively small. Out of the 1994-1998 baseline years, in the London Borough of Harrow, there were 14 PTW KSI in 1994, 1996 and 1997, and 9 in each of 1995 and 1998. The difference between the maximum and minimum figure was 5 – the same level as the target reduction. Numbers for fatalities are not given, neither are numbers of slight casualties. Therefore, a comparison of the severity proportion with the City of Westminster is not possible. Figures for motorcycle casualties are shown in figure 32 below.

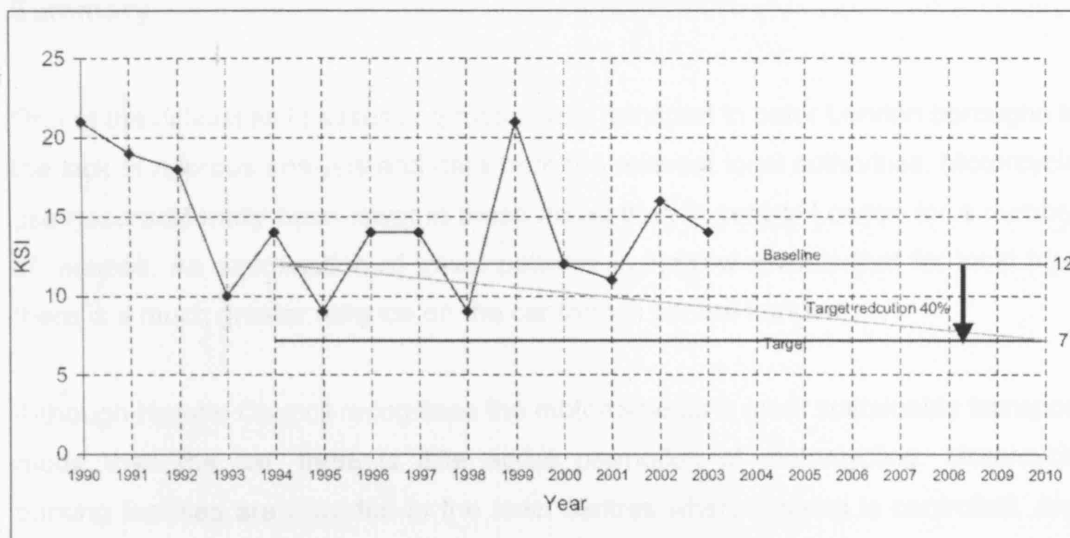


Figure 32: Motorcycle casualties in Harrow

Source: Harrow, 2006: 322

The Council notes that for motorcycles, the casualty reduction target has not been achieved, and the current rate of reduction is not sufficient for the target to be met. To attempt to address this issue, and to aim to improve road safety among motorcycle and moped riders, the Council is engaging in local promotion of safety issues to vulnerable road users through dealer outlets, local companies and colleges. This is in addition to supporting Transport for London and national campaigns (Harrow, 2006: 323).

The London Borough of Harrow has been asked by Transport for London to lead with seven other boroughs the promotion of local publicity materials that can be used to tackle moped and motorcycle rider casualties. A budget of £130k for the financial year 2005/6 has been allocated for the eight boroughs. There is an indication from TfL that future year will be funded with additional features being added to the initial concept and possibly with additional boroughs being involved (Harrow, 2006: 332).

Summary

One of the difficulties in assessing motorcycle transport in outer London boroughs is the lack of rigorous analysis and data from the relevant local authorities. Motorcycle use has traditionally been lower in these areas than in central London for a number of reasons. An examination of travel patterns in Harrow reveals that for local trips there is a much greater reliance on the car than in central London.

Although Harrow Council recognises the motorcycle as a more sustainable transport mode than the car, there is little active promotion of motorcycling. Motorcycle parking facilities are provided in the town centres where parking is controlled, and motorcyclists can park free of charge in residents' bays. The borough has high levels of car ownership, and the residential land use pattern is such that the car can be easily accommodated. To promote greater motorcycle use, the Council would need to place restrictions on car parking and promote the benefits of modal shift to motorcycles. This would be contrary to the aims of the Mayor's Transport Strategy (GLA, 2001b) which does not recognise motorcycles as a favoured transport mode.

Part Four

Discussion

One of the difficulties in attempting to formulate a sustainable transport strategy for London is the lack of a clear definition of what is meant by a sustainable transport system.

The definition of a sustainable transport system used in this thesis was one which:

Allows for the efficient working of an economy that allows all to participate in the daily life of London while minimising the damage the transport system causes to the human and natural environment, both globally and locally.

This definition concentrates on the system as a whole, rather than particular modes within it. As has been shown in the preceding case studies section, Westminster City Council assesses sustainable transport in terms of the mode that is used: regarding public transport, cycling and walking as sustainable modes and cars and motorcycles as unsustainable modes. Harrow Council, in outer London, recognises that, within their borough, the motorcycle is a more sustainable mode than the car.

Another difficulty in assessing what constitutes a sustainable transport system is taking into account the requirements of the end user, and the type of transport system that Greater London needs to ensure that it functions efficiently. The Transport White Paper (DETR, 1998) recognises that there is a hierarchy of transport modes, each of which has a part to play in an integrated transport system. The Mayor's Transport Strategy (GLA, 2001b) recognises that private transport does have a role to play in the Greater London area, and by extension, as do motorcycles as an alternative to the car.

It has been established in the preceding sections that a sustainable transport system is one that aims to reduce the environmental impact of that mode. However, David Banister, and others, argues that private motorised transport is inherently unsustainable (Banister, 2005) insofar as it consumes resources and occupies public space that has effectively been privatised by the user.

Thesis Questions

This thesis has attempted to answer the questions:

- Do motorcycles represent a more sustainable transport mode than the private car in Greater London?
- Could an increase in motorcycle use, at the expense of either car or public transport use, have a significant impact on the sustainability of transport in London?
- Would encouraging motorcycle use present a more sustainable approach to London overall, in terms of secondary environmental measures?
- What role can land-use planning have in assisting motorcycle use?

Each of these questions will be examined in turn.

Do motorcycles represent a more sustainable transport mode than the private car in Greater London?

To assist the comparison of transport modes in an attempt to answer this question, it is useful to summarise the positive and negative sustainability aspects of various surface transport modes. This is done in table 14 below.

Transport Mode	Environmental Benefits	Environmental Costs
Walking	Low environmental impact Provides exercise	Slow form of transport Not available to all Uses space Only suitable for short distances
Cycling	Non-polluting Gives users exercise Door-to-door transport	Relatively slow form of transport Only suitable for shorter journeys (up to five miles) Can cause congestion Users need parking facilities

<p>Bus</p>	<p>Can carry large numbers of passengers</p> <p>Fuel inefficiency of buses offset by passenger numbers</p> <p>Can carry passengers with mobility difficulties</p> <p>In use for long periods, so therefore they spend little time parked</p>	<p>Produces pollution, especially PM₁₀</p> <p>Can cause congestion while stationary at bus stops</p> <p>Use roadspace</p> <p>Produce noise</p> <p>Damage road surfaces</p> <p>Relatively fuel inefficient vehicles.</p> <p>Only use designated routes, can be a slow form of transport</p> <p>Not always available at convenience of passengers</p> <p>Low occupation levels can result in more pollutants per passenger kilometre than cars or motorcycles</p>
<p>Taxi</p>	<p>Provides transport to users' destination</p> <p>Can carry passengers with mobility difficulties</p>	<p>Cause pollution, especially PM₁₀, although emissions standards being applied</p> <p>Use roadspace</p> <p>Can contribute to congestion when stopped for a fare</p> <p>Produce noise</p> <p>Damage road surface</p> <p>Produce pollution while driving when not carrying a fare</p> <p>Can be expensive</p>

Motorcycle	Door-to-door transport Produce less CO ₂ than cars or taxis Can be used by riders or to carry passengers with mobility difficulties Available at driver's convenience	Polluting vehicles Produce noise Riders and passengers at higher risk of injury than for other transport modes Require space for parking
Car	Door-to-door transport Can be used by drivers or to carry passengers with mobility difficulties Available at driver's convenience	Polluting vehicles Produce noise Predominant cause of road traffic collisions Can contribute to congestion Require space for parking

Table 14: Costs and benefits of surface transport modes

In attempting to assess whether motorcycles represent a more sustainable transport mode than the car, it is also necessary to examine various indices of what constitutes sustainability. This section will examine emissions; damage to the road system and land use requirements; road safety; accessibility and utility; and suitability for the journey. One index that has not been examined is the lifetime environmental cost of motorcycles; however, as with all forms of transport, the motorcycle is a manufactured good that needs to be disposed of at the end of its life.

Emissions

As the vast majority of motorcycles use petrol, they produce emissions – with little technological scope, at present, for them to use alternative fuels. Motorcycle emissions standards are currently one Euro stage behind cars, and motorcycle emissions are not tested at the annual vehicle inspection (MoT test). Although hydrocarbon (HC) and carbon monoxide (CO) emissions are higher than for cars, they produce fewer oxides of nitrogen (NO_x). In general, the fuel efficiency of motorcycles leads to much lower carbon dioxide (CO₂) emissions (GAGM, 2004: 44). As noted in the government's motorcycling strategy, the contribution motorcycles make to road traffic pollution is considered to be minimal (DfT, 2005a).

What has emerged from the literature is that the proportion of UK emissions produced by motorcycles has remained relatively constant over the past ten years, notwithstanding a 47% increase in their use. In the same period, car use has increased by approximately 10% (DfT, 2006b), while emissions from cars have reduced by 25%. In terms of the improved fuel efficiency of engines, CO₂ emissions from cars should have decreased by 37%, but the full extent of that efficiency gain has not been realised because of the increasing energy requirements of new secondary safety features that new cars are required to have (Foley & Ferguson, 2003). If these figures are broken down, it reveals that relative emissions per motorcycle have fallen at approximately the same rate as emissions per car. However, because motorcycles have not been fitted with additional secondary safety systems which put extra strain on the engine, this means that the relative efficiency of motorcycle engines has not improved as much as car engines.

While motorcycling remains a minority and little-regarded transport mode, the manufacturers will not devote sufficient resources to reducing the environmental impact of motorcycles. The fiscal regime applied to cars, through emissions-related Vehicle Excise Duty (VED), is as much about the information it conveys from the government to car manufacturers and purchasers as it is about the revenue it generates. By fixing the VED for the least polluting cars at zero, the Chancellor has sent a message that such vehicles are preferable than those which generate the most CO₂. At present, there are no cars available in the UK in the lowest VED category, but the message has been sent, as manufacturers will have an incentive to produce and market, and consumers will have an incentive to purchase, cars in that category.

With motorcycles, the most expensive VED band is currently £62, (£22 more than a band B petrol car and £38 less than a band C petrol car) although for motorcycles between 400 and 600cc it is only £46 (£6 more than a band B car) (DVLA, 2006). Although fiscal incentives could promote the use of more fuel-efficient machines with smaller engines, there is little evidence that motorcycle choice is sensitive with that regard (Brown, 2006).

One of the aims of the congestion charge was to improve air quality in central London. As Mannings (2006) has noted, the increase in diesel vehicles circulating in the zone has led to an increase in particulate emissions. However, certain low emission and hybrid vehicles, such as the Toyota Prius, are exempt from the

charge, leading Banister (2005) and others, to question whether it is a congestion charge or a tax on pollution. Mannings argues it is neither – it is a mechanism to raise funds to invest in other transport initiatives.

In Rome, which has traditionally experienced high levels of traffic and associated pollution, all private vehicles entering the historic city centre must display a blue disc to demonstrate that the vehicle has passed an emissions test. This applies to motorcycles and mopeds as well as cars. The stamp has to be displayed on a car, but only needs to be carried by the motorcycle or moped rider (ACEA, 2004).

In Italy in general, and Rome in particular, motorcycles make up a more significant proportion of the vehicle stock. In Italy there are approximately 4.3 million motorcycles and 5.9 million mopeds registered, as opposed to 1.3 million motorcycles and 180,000 mopeds in the UK, based on 2003 figures (ACEM, 2005, 11 & 13). The greater popularity of motorcycles and mopeds in Italy can, in part, be attributed to climate, in part to culture and in part to children having access to some mopeds from age 14.

At present, the Mayor of London is consulting on proposals to introduce a low emissions zone for buses, coaches and medium and heavy goods vehicles in Greater London. This is, perhaps, a missed opportunity to help reduce emissions from all transport modes, including cars and motorcycles, through a similar system to the blue disc in Rome.

Fuel economy is not a major selling feature of most motorcycles. Motorcycle emissions are not tested at the MoT stage, and vehicle excise duty rates depend on engine size alone, rather than CO₂ emissions. Motorcycle manufacturers therefore have little incentive to improve the efficiency of their engines, other than to meet the current Euro III standard.

Emissions levels from any vehicle depend on driving style and traffic conditions. As demonstrated earlier, the optimum speed for minimising vehicle emissions is 50kmh (RUA, 2005), although average car traffic speeds in London are lower than this (TfL, 2005a; TfL, 2006). Because of their ability to filter, motorcycles spend less time in stationary and slow moving traffic and operate at more optimal levels. Testing of motorcycles to assess their emissions standards in the vehicle type approval process carried out by the Vehicle and Operator Services Agency is not, however,

done through a real-world test cycle. It depends on an average of two readings, one at wide open throttle and one at half open throttle. The United Nations has been exploring methodologies for a more realistic method of assessing motorcycle emissions, although no progress has been made on this in recent years (Carey-Clinch, 2005).

What has emerged from the literature is that, in general, motorcycles have better fuel efficiency than cars, especially in the urban environment, which is also reflected in their emissions levels.

In this regard, motorcycles could be considered a more sustainable mode than the car.

Damage to road system and land use requirements

In terms of their requirements for road space, motorcycles place fewer demands on the infrastructure than other vehicles. When moving in free-flowing traffic, they occupy approximately half the space of a car. As congestion increases, the ability of motorcycles to 'filter' means that their pcu equivalent falls, potentially to zero as they make use of redundant space that would otherwise not be used (VMAC, 2000). The ability of motorcycles to make progress at the prevalent traffic speed (when it is moving), or above it when congestion slows the flow, means that they cause less congestion than cars or even bicycles.

As London's population increases, there is a limit on the capacity of the public infrastructure to cope with demand. The (unpublished) Halcrow report demonstrated that in areas of high public transport provision, such as London, modal shift to motorcycles tends to come from public transport, rather than from private cars. Transport, and transport mode, is a personal choice. What the studies have not demonstrated is the level to which those individuals would have stopped using public transport anyway. A shift from public transport to motorcycles is less unsustainable than a shift to cars, given that motorcycles are placed 'higher' in the transport hierarchy than cars (DETR, 1998). One of the results of modal shift away from public transport is that it frees up capacity for new passengers on the public transport network while making fewer demands than a car on the road network.

In terms of land use requirements for parking, it is possible to park between five and eight motorcycles in the space required for a car. Motorcycles also have the advantage that they can be parked in otherwise redundant parts of the highway, provided they do not cause an obstruction. However, pavement parking is generally not permitted anywhere in Greater London. In addition to occupying very little of the highway, motorcycles cause almost no damage to it (IHIE, 2005). However, motorcycles also rely on the same transport infrastructure as other road vehicles and require similar, if not higher, standards of road maintenance than cars. Road safety audits for new road and traffic management schemes do not include a full assessment of the needs of motorcycles, often due to a lack of expertise and understanding by relevant officers.

In terms of land use and damage to the road surface, motorcycles could be considered a more sustainable mode than the car.

Road Safety

Road safety is one of the main drivers of transport policy in London. It is generally recognised that motorcycles have a poor safety record when compared to other modes of transport (DfT, 2004d). However, what the headline figures do not consider is the fall in the casualty rate as expressed per passenger kilometre. In the urban environment, the majority of collisions resulting in an injury to a motorcycle rider or passenger are the other party's fault (DfT, 2004g).

In Greater London the motorcycle casualty rate is lower than the rest of the UK (TfL, 2004c). An examination of the figures demonstrates that once a certain level of motorcycle use is established, there is an inverse relationship between casualty rates and levels of use (TfL, 2004c).

Research by Broughton and Buckle for the Transport Research Laboratory confirms this relationship on a national level. They note that since 2001 the KSI rate for motorcycles has progressively returned to the 1983-1998 fitted line, as opposed to the 1993-2003 fitted line (Broughton & Buckle, 2005: 18). They concluded that, based on an assumption that motorcycle use will increase by a factor of 1.5 from its 1998 level, an additional reduction of 8.3% reduction in motorcyclists killed or seriously injured nationally will need to be achieved to meet the government's target by 2010.

In terms of addressing motorcycle safety, there are currently no viable secondary safety features that could be fitted to the machine. Motorcycle riders are vulnerable in much the same way that pedal cyclists are. While it is possible to mitigate the effects of a collision through the use of protective clothing, even a relatively minor collision can cause the rider to fall off and result in considerable damage both to the rider and the motorcycle.

Of the factors that can be influenced with respect to road safety – the bike, the rider, the road condition, the type of journey and riders' and drivers' attitudes – most are factors that can only be influenced in the long-term as the motorcycle fleet and the cohort of motorcycle riders change.

The motorcycle that someone rides tends to be the bike that they have, and for most riders can be considered as a constant. The government notes that there is a sports bike phenomenon, reflected in, reflected in, and perhaps encouraged by, the mainstream motorcycle press, with an emphasis on performance and power, which may be beyond some riders' skill levels. While not wishing to prescribe the style of motorcycle riders purchase, the National Motorcycle Strategy recommends that the manufacturers and retailers place a greater emphasis on the merits of other models (DfT, 2005a: 25).

The data on motorcycle riders and collision involvement indicate that experience, rather than age, is the key indicator of likelihood of involvement in a collision. Experience is something that can only be acquired after time. There is a correlation between the introduction of BikeSafe and a reduction in the collision rate for motorcycles, but no causal link can be established. While schemes such as Pass Plus and BikeSafe (and the more recently launched ScooterSafe in London) do equip riders with additional skills, these are voluntary schemes.

Road conditions can be changed, but they require investment and commitment by the relevant highway authority, and are dependent on the political priorities of the highway authority. Improvements in road conditions are a long-term issue that is beyond the scope of this thesis.

The journey that someone has to do is often dictated by the purpose of the trip. In terms of road safety, there is little that can be done to alter this, other than to investigate alternatives to using the motorcycle for that journey.

One of the few factors that can be more easily influenced is riders' and drivers' attitudes. This is generally achieved through advertising. It is also achieved through the hazard perception test in the driving theory test, although this only applies to new drivers.

As noted above, road safety measures are not implemented in isolation, so the effect that each can have is difficult to assess. What has emerged is that increasing numbers of motorcycles have led to a reduction in motorcycle casualty rates. The City of Westminster case study demonstrated that motorcycle casualty rates are lower in central London than elsewhere in the UK. It also demonstrated that the proportion of injury collisions that result in death or serious injury is lower than the rest of the UK. In central London, motorcycle use is higher, and traffic densities in general are greater, than in the rest of the UK. In terms of individual motorcyclist safety, it would appear that riders have a better safety record in central London than elsewhere. This can, in part, be attributed to greater numbers of motorcycles, as traffic densities in inner London have been decreasing since 2003 (TfL, 2006).

As noted in the case studies, the numbers of motorcycle casualties are relatively low, and restrictions placed on motorcycling with the intention of reducing casualties still further could have the opposite effect. Although it could be argued that a factor behind the recent reduction in motorcycle casualties is the reduction in the number of cars in central London, and analysis of historic casualty data suggests that motorcycle casualty rates are at their lowest when motorcycle use is at its highest.

However, motorcyclists are still at an increased risk of injury compared to other transport modes. On balance, given that increased risk level, in this regard motorcycles cannot be considered a more sustainable transport mode than the car.

Accessibility and utility

Motorcycles are not accessible to everyone. As Burge *et al* (forthcoming) have noted, the decision to use a motorcycle for a particular trip is dependent, in part, on having a motorcycle available. This therefore implies that the individual has at least

passed the Compulsory Basic Training and has a valid motorcycle licence. While motorcycling remains a minority activity, there is much less parental or societal influence to obtain a motorcycle licence than there is to obtain a car licence. Anecdotal evidence suggests that many parents seek to dissuade their children from obtaining a motorcycle.

Not all individuals are capable of riding a motorcycle, notwithstanding the work done by the National Association of Bikers with a Disability (NABD) to undertake adaptations to allow disabled motorcyclists to ride.

Private transport is inherently socially unequal. It requires an initial capital investment that some may not be able to afford. However, motorcycles can provide a cheaper alternative to the car (GLA, 2001b) and can be cheaper even than public transport (MCIA, 2001). They can be especially useful in areas not well served by public transport. They provide convenient transport that can be used for the whole journey, and at times when public transport may be limited or unavailable.

Motorcycles are also available from the age of 16 (for mopeds), and can assist people to become economically active, especially in areas of low public transport provision (MAG, 2005a; CA, 2002). They can also provide a sense of personal security to vulnerable individuals (MAG, 2005a).

Because of the size of motorcycles, especially scooters, and the potential resale value of parts, motorcycles are particularly vulnerable to theft (MCRG, 2004). Small motorcycles are also vulnerable to theft and use in anti-social behaviour (Islington, 2005).

Notwithstanding the high levels of public transport provision in Greater London, the use of a motorcycle offers an individual an additional modal choice. Public transport can be unreliable, unpredictable and, for some journeys, impractical. The thesis survey demonstrated that a significant proportion of respondents stated that they prefer not to use public transport. As one respondent noted:

'If I tried to use public transport (not that I would as I hate it) it would cost me at least twice as much and take twice as long needed a diesel swilling bus and a train to go a measly 22 miles.'

Another noted:

'Try taking public transport at rush hour when you need to be somewhere on time and you have 20 minutes get there that's where the bike comes in.'

Although the motorcycle is a less sustainable transport option than public transport, many individuals prefer the reliability of service and consistency of journey times that the motorcycle (rather than the car) can afford. If congestion is encountered on a route, the motorcyclist can generally negotiate a path in a way that car drivers cannot. Many motorcyclists also express an enjoyment of being in control of their journey, rather than being a user of a transport system over which they have no control, and which can often be overcrowded and unpleasant.

It is difficult to assess whether in terms of accessibility and utility the motorcycle is more or less sustainable than the car. In terms of cost and the potential for social inclusion, they can be more beneficial than the car, but they are also more vulnerable to theft and damage. Although motorcycles can be adapted for use by disabled riders, the range of adaptations available for a two-wheeled vehicle is less than that available for three or four-wheeled vehicles. In terms of the utility of the motorcycle, many riders report that they find the mode easier to use and more practical than either public transport or the car. For trips into central London, which are made by modes other than public transport, walking or the bicycle, the motorcycle offers a cost-efficient and quicker alternative to the car.

Suitability for the journey

Not every journey that can be made by car could also be made by motorcycle. For example, trips that involve the carriage of more than two people or of significant amounts of luggage may require larger vehicles. All motorcyclists are required to use a protective helmet, and many also choose to wear protective clothing. It may not always be possible to carry alternative clothing, or have the opportunity to change at the journey's end. Mixed mode journeys do not appear to be that popular with motorcyclists. This is in part because the availability of parking at the destination allows the rider to make the whole trip using the single mode. In part this is also because transport interchanges rarely provide suitable storage and changing facilities that motorcyclists require, and travelling and walking in motorcycle clothing can be uncomfortable. As noted above, a significant proportion of respondent to the survey also ride because they prefer not to use public transport.

Westminster City Council argues that, because their borough is so well served by public transport, there is no need for anyone to use private transport. However, while this may be true for the destination, it may not be so for the origin. In terms of a mode of transport for an individual who has little, if any, luggage to carry, the motorcycle can provide a more suitable alternative to the car. For a journey that is within, or has an end point in, outer London, the motorcycle may be a more sustainable form of transport than the car and more suitable than public transport in terms of convenience to the end user. For journeys within inner and central London, the motorcycle may be more sustainable than the car, but may not be as suitable as public transport, walking or cycling. However, as one respondent noted: 'I started using a bike to commute because the rail system was so unreliable. I find it quicker and cheaper.'

The ITS survey demonstrated that motorcycling is a seasonal activity, being more popular in the summer than the winter. This is not surprising, given the exposure to the elements that riding a motorcycle necessarily entails. While it is possible to purchase clothing that mitigates the worst effects of inclement weather, many motorcyclists choose to use alternative modes when it is cold, wet or both. The lack of suitable changing and storage facilities at the destination can also contribute to making winter motorcycling less popular.

On balance, for many journeys that could be made by car, especially if the vehicle is used for a single person, the motorcycle can provide a suitable alternative, and as such could be considered a more sustainable mode than the car.

Of these tests of whether motorcycles represent a more sustainable transport mode than the car, on balance, it could be considered that motorcycles represent a more sustainable transport mode than the car. However, this is also dependent on the type of journey undertaken. For some short journeys a more sustainable option would be to use public transport, a bicycle or to walk.

The example of the City of Westminster demonstrated that the motorcycle may not be the most suitable mode for commuting to inner London, given that that area is well served by public transport. However, many motorcyclists prefer to use a motorcycle as it can be quicker, cheaper and more convenient than other modes, including public transport and the car.

Could an increase in motorcycle use, at the expense of either car or public transport use, have a significant impact on the sustainability of transport in London?

As noted in Part Two, motorcycling is a minority transport activity in the UK as a whole. Although motorcycles comprise a higher proportion of surface transport in London than elsewhere in the UK, they are still only used for approximately 2% of journeys in Greater London as a whole. Even if motorcycle use were to double, this would only represent 4% of surface journeys in Greater London.

The transport measure that has had the most profound impact on car use in London in recent years is the introduction of the congestion charge. However, this currently only applies to a limited area of central London, and has only been in operation for three years. When the charge was introduced, out of the 15% reduction in cars entering the zone during charging hours, about 10% was transferred to motorcycles (TfL, 2004d). Therefore, only about 1.5% of journeys that were previously made to or in the zone by car transferred to motorcycles. In the period leading up to the congestion charge, there was also an increase in public transport capacity and use, most notably through the provision of greater numbers of buses.

What has emerged from this thesis is that the increase in motorcycle use in London cannot be attributed to the congestion charge, although this did have an effect on the level of motorcycle use within the charging zone in the immediate period following its introduction. More recent data from Transport for London (TfL, 2006) suggests that the medium-term effect has been relatively neutral with respect to motorcycle numbers, although this could be in part attributable to an insufficient provision of motorcycle parking by the central London boroughs.

To comprehensively assess the effects that an increase in motorcycle use would entail might, at first supposition, require a detailed knowledge of transport modelling. Neither of the popular transport models used by transport planners (SATURN and URANUS) nor the National Transport Model include motorcycles (DfT, 2003).

The Halcrow study suggested that in areas of high public transport provision modal shift to motorcycles tends to come from public transport rather than from cars. What the research has not demonstrated is whether in areas where there are fewer

restrictions on car use, modal shift from public transport tends to be to cars. As noted earlier, the increase in motorcycle use in central London has come, in part as a response to congestion, either on public transport or on the highway. In these circumstances, although there has been modal shift from public transport, it has been onto motorcycles rather than into cars. The conclusion that can be drawn is that modal shift to motorcycles, from either public transport or from cars, is greater when greater restrictions are placed on car use.

If the example of the congestion charge were to be extrapolated, then a doubling of motorcycle use would also entail a considerable reduction in car use. As observed when the congestion charge was introduced, the more significant modal shift was from cars to public transport. The Halcrow report predated the introduction of the congestion charge, and the evidence from the congestion charge suggests that when car use is curtailed, the main beneficiary is public transport.

If motorcycle use were to double, this would come at the expense of both car use and public transport use. While a measure that takes revenue away from public transport may be considered detrimental to the public transport system, it would serve to free up capacity for the increased demand that is to be expected over the lifetime of the Mayor's Spatial Development Strategy. It could also have the benefit of helping to reduce overcrowding on public transport and make journey times more reliable for individual users.

Individuals react to changing transport circumstances, and some often react quite quickly. In the immediate aftermath of the July bombings in 2005, there was a much-reported increase in cycling in London – most of which had come at the expense of public transport. At the same time, there was a disproportionate increase in cycle casualties (TfL, 2006), which suggests that an initial increase in use by a vulnerable mode, as happened with motorcycles from 1995, is associated with increased casualties. As noted above, the main indicator of likelihood of involvement in a collision is lack of experience.

When there is a significant increase in the use of a particular mode, a higher proportion of that mode will be inexperienced. If, in any given year, 10% of individuals stop using a particular mode of transport, and total use of that mode increases by 10%, this represents a one-fifth cohort of inexperienced users.

Phil Goodwin has noted:

'Travel behaviour is very much more volatile and changeable than is often thought, it is significantly sensitive to transport policy (whether intended or not) and a decision to "leave behaviour alone" simply does not exist. Behaviour does and will change, and everything that Government chooses to do, or chooses not to do, has an impact on these changes. The scope for making things better (or, indeed, worse) by changing behaviour is substantial, and unavoidable....' (Goodwin, 2005)

Since 1995, motorcycle use in London has been increasing, as has public transport use. In central London, car use declined before the introduction of the congestion charge, yet there has been an increase in the overall number of journeys that are made in Greater London.

There is evidence that increases in motorcycle use do come, in part, as a result of modal shift away from public transport, with a smaller proportion coming from cars. If further restrictions were placed on car use then any significant increase in motorcycling would come about as a result of modal shift from cars to other transport modes, with a small proportion of that shift going to motorcycles. Therefore, if car use were to be further restricted, then an increase in motorcycling would be a by-product of a significant impact on the sustainability of transport in London. If restrictions were placed on motorcycles, a transport alternative would not be available to the end user, and the extent of modal shift away from cars may not be as profound.

Would encouraging motorcycle use present a more sustainable approach to London overall, in terms of secondary environmental measures?

One of the major secondary environmental measures that are considered by transport planners is road safety. When motorcycle use in London increased from 1995, there was initially an increase in motorcycle casualties. Once the concentration of motorcyclists became sufficient, not only did the casualty rate for motorcycles decline, following a further time lag so did the crude numbers. If motorcycle use were encouraged, and numbers increased further, there would be additional road safety benefits.

As noted in part two, it is possible to park between five and eight motorcycles in the space required for a car. If greater numbers of people used motorcycles instead of cars, there would be less land take required for parking.

Motorcycles are cheaper to run than using public transport, and therefore can help promote social inclusion.

One aspect of sustainable transport is its requirement to allow for the efficient working of the economy that allows all to participate in the daily life of London.

As noted in the case study, a significant proportion of motorcycle trips are either work-related or otherwise related to the economy. Many users find the motorcycle an efficient way to commute in or to London. They are also a significant vehicle of choice for people whose work requires them to travel within London during the working day. Motorcycles are sometimes used for the delivery of urgent items. They are also used by the emergency services. The ability of a motorcycle to move through traffic enables the Police to patrol efficiently. The Paramedic bike service, for example, is often the first on scene and can make the difference between life and death (MAG, 2005a).

One aspect of transport planning that is often overlooked is the requirement for the system to enable London to function efficiently. As noted in previous sections, motorcycle use can assist in the efficient working of the surface transport system as part of an integrated approach to accommodating the whole transport hierarchy.

What role can land-use planning have in assisting motorcycle use?

Phil Goodwin (2005) has noted that, 'Because travel behaviour does change, then it can be changed.' This means that, provided suitable measures are put in place to assist motorcycling, then motorcycle use will change.

As noted in the case study from the London Borough of Harrow, the land use pattern was created by the transport system. In the twenty-first century, the transport system is predicated on the land-use pattern. Decisions on development are informed by transport provision and accessibility.

The increase in motorcycle use came about at a time when there was no national motorcycle strategy. In 1996 the UK government published the first National Cycling Strategy, with the aim of doubling cycling by 2002 and quadrupling it by 2012. These targets were not achieved and have now been abandoned. According to Guthrie (2003), an infrastructure approach alone will never succeed in facilitating a mode switch.

What has emerged from both the thesis and MAG surveys is that one of the most significant factors that influences motorcycle use is the availability of parking, be it public or private. This is most pronounced in central London. Where parking is restricted, then use of the restricted mode adjusts to reflect the available parking capacity.

One measure that land-use planners could use to assist motorcycling is a requirement for planners to take account of the needs of motorcyclists, and by extension cyclists, when assessing proposals for new development. This would require local planning authorities to ensure that adequate parking facilities, either on street or as part of the development are provided. Where appropriate, suitable changing and storage facilities should be provided for the benefit of motorcyclists and cyclists.

The Mayor's Spatial Development Strategy (GLA, 2004a) requires that new development, especially in inner London, be constructed at higher densities. If car ownership levels remain as they are, this will lead to more pressure for parking and roadspace use by all types of vehicles, including motorcycles. Encouraging modal shift away from cars will have greater impacts on road space usage than concomitant increases in motorcycle use (TfL, 2004d).

A summary of the advantages and disadvantages of motorcycles is given in table 15 below.

Issue	Advantages of PTWs	Disadvantages of PTWs
Air quality	<ul style="list-style-type: none"> relatively low overall contribution to air pollution due to relatively small proportion of PTWs motorcycles are five times better than cars for NO_x 	<ul style="list-style-type: none"> motorcycles can be worse than cars for carbon monoxide and hydrocarbons
Noise	<ul style="list-style-type: none"> PTWs that are designed according to current EU noise limits are much quieter than older PTWs 	<ul style="list-style-type: none"> most motorcycles are exempt from the EU noise limits for new motorcycles there is virtually no enforcement of PTW noise
Road safety	<ul style="list-style-type: none"> Greater numbers of PTWs lead to a lower casualty rate 	<ul style="list-style-type: none"> motorcyclists are at a much greater risk of death or serious injury than other road users
Congestion	<ul style="list-style-type: none"> PTWs contribute very little to traffic congestion in London PTW users benefit from the ability to bypass queues and reduce journey times 	<ul style="list-style-type: none"> in cities like London where a significant proportion of travel is by public transport, an increase in PTW use does not reduce traffic congestion
PTWs in bus lanes	<ul style="list-style-type: none"> use of bus lanes may improve safety for PTW users 	<ul style="list-style-type: none"> would discourage cycling due to PTWs' relative high speeds, noise and air pollution
Parking and thefts	<ul style="list-style-type: none"> PTWs occupy less parking space than cars or vans 	<ul style="list-style-type: none"> PTWs particularly vulnerable to theft

Table 15: Advantages and Disadvantages of Motorcycles

Source: Adapted from Islington, 2005: D7

Conclusion

This thesis has attempted to answer the questions:

- Do motorcycles represent a more sustainable transport mode than the private car in Greater London?
- Could an increase in motorcycle use, at the expense of either car or public transport use, have a significant impact on the sustainability of transport in London?
- Would encouraging motorcycle use present a more sustainable approach to London overall, in terms of secondary environmental measures?
- What role can land-use planning have in assisting motorcycle use?

In general, motorcycles are more sustainable than private cars. However, some of the uses associated with motorcycles is not necessarily the most sustainable mode for a particular journey.

Studies have suggested that in areas of high public transport provision, modal shift to motorcycles tends to come from public transport rather than from cars. However, it has also been demonstrated that many people use a motorcycle to avoid congestion, be it congestion on the roads or congestion in public transport.

In recent years motorcycle use in London has been increasing, as has public transport use. Given that all transport modes are subject to churn in the individuals that use them, this suggests that there is considerable fluidity in the users of both modes. There has also been an increase in cycling at the expense of public transport.

Westminster City Council, in central London, argues that motorcycles have no place in a sustainable transport system, especially in an area that is well served by public transport and has high public transport accessibility levels. The London Borough of Harrow, by contrast, recognises that motorcycles are more sustainable than cars and attempts to make provision for motorcyclists.

Motorcycles use fossil fuel and produce emissions. At present, motorcycle manufacturers have few incentives to produce more fuel-efficient or alternative fuel

machines. This is something that could be addressed through the vehicle excise duty regime in a similar manner to cars.

The emissions that motorcycles produce remain one Euro standard behind cars, and although motorcycles produce less CO₂ and NO_x than cars, they perform less well in terms of hydrocarbons and carbon monoxide. Motorcycle emissions are not tested at the MoT stage, so there is no incentive for users to keep their machines at optimal performance. Overall, it is considered that as their contribution to road traffic pollution is minimal, greater effort should be made to reduce emissions from other sources.

Some transport planners and cycle lobbyists argue that London is a city that is made for public transport and cycling. However, this does not recognise the individual freedom that a motorcycle can bring, or the suitability of a motorcycle for some journeys.

The argument that motorcycling should be discouraged because the majority of people who take up motorcycling in London switch mode from public transport is noted. What the literature does not consider is the level of modal shift that would transfer to cars if motorcycles were not an available alternative transport mode. In recent years, patronage on the public transport network in London has increased dramatically, against the trend of the rest of the country. At the same time, both cycling and motorcycling have increased in popularity. This suggests that there is sufficient scope and cause for motorcycling to assist in the efficient working of London's transport system.

An analysis of the casualty numbers for all surface modes indicates that that when a particular vulnerable mode of transport, such as motorcycling or cycling, increases in concentration, there will be an initial increase in casualty numbers. This is partly because of inexperienced individuals using that mode and partly because of a time-delay in other road users becoming cognitive of that mode. Once motorcycle use reaches a critical level, casualty numbers start to fall.

The argument put forward by some transport planners that the increase in motorcycle use in London was a direct result of the congestion charge has been disproved. The increase began in 1996, some seven years before the introduction of the charge. Surveys carried out by the Institute of Transport Studies (ITS, 2004), the

Motorcycle Action Group (MAG, 2006a), Transport for London (TfL, forthcoming) and for this thesis have demonstrated that the primary reasons why motorcyclists in London choose the powered two wheeler option are to avoid congestion, for faster journey times and for cost. However, the motorcycle option is not for everyone. As Burge *et al* (forthcoming) note, the use of a motorcycle is dependent on choosing to have a motorcycle in the first place and then to use it for a particular trip.

In order to improve the sustainability of motorcycles, it is recommended that motorcycle emissions be tested at the MoT test stage to ensure compliance with emissions standards over the lifetime of the machine, and that Vehicle Excise Duty rates be aligned with motorcycle CO₂ emissions as they are with cars. Furthermore, it is suggested that London's air quality could be improved if both cars and motorcycles entering the new controlled emissions zone need to meet established standards, as is currently the case in Rome.

This thesis has demonstrated that, while motorcycling may not be the most sustainable form of transport in London, it is a less unsustainable form than the car. If individuals who intend to use private motorised transport can be encouraged to use two wheels instead of four, then this will make a significant contribution towards increasing the sustainability of transport in London.

Omissions and suggestions for further research

This thesis on the contribution motorcycles can make to sustainable development in London has tended to concentrate on the vehicles and their use, rather than on the users, the motorcyclists themselves. A more comprehensive assessment of the environmental attitudes of motorcyclists would inform the sustainability debate. If it could be shown that motorcyclists tend to demonstrate more sustainable lifestyles in general than car drivers, then a stronger case for the promotion of this transport mode could be made.

Another suggestion for further research, with more of a social science bias, would be to what extent it is possible to persuade motorcyclists to change potentially damaging behaviour, be it with respect to road safety or to sustainable lifestyles.

This thesis has omitted a study of the fuel price sensitivity of motorcycle choice in terms of fuel efficiency. Although motorcycles are generally more fuel efficient than cars of similar type, there is little evidence that fuel efficiency is a significant factor in choice of type of motorcycle.

Motorcycles are manufactured goods, and a whole life assessment of the sustainability of motorcycles as compared to cars would assist in broadening the knowledge base of the subject matter.

A study on the factors that prevent individuals from taking up motorcycling would assist in tailoring access programmes to encourage people who could use a motorcycle as an alternative to the car to do so.

A study of the reasons and motivations behind individuals ceasing to use public transport, in favour of either cars or motorcycles, and what steps could be taken to mitigate the effects of modal shift.

The ITS (2004) and TfL (forthcoming) surveys demonstrate that motorcycling is still largely a male activity, with only one in seven London motorcyclists being female. Observational analysis also indicates that there is minimal take-up of motorcycling among black and minority ethnic communities. An analysis of the barriers to motorcycling amongst women and black and minority ethnic communities could assist in developing strategies to facilitate their entry to motorcycling.

The introduction of the central London congestion charging scheme observed that about 10% of the reduction in car trips to or within the zone was transferred to motorcycles. The effect on motorcycling of road user charging schemes, and whether motorcyclists were required to pay or not, could assist in formulating road user charging schemes.

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Appendix A – Style Category Definitions

AdventureSport (including Supermoto)

These bikes are similar in style to Trail/Enduro motorcycles but are predominantly designed and capable for on-road use only. Often they will have features similar to machines included in the Touring category e.g. fairings, luggage carrying capacity etc.

Custom

These machines include 'cruisers' and 'choppers'. They have flat but typically feature high handlebars, low seat height and forward footrests. Body panels and fittings contain high polished chrome content.

Naked

Machines are built to a basic specification with no fairing (or only a small handlebar fairing) and an upright riding position – sometimes called retro.

Sport/Touring

Machines that fit between the SuperSport and Touring categories. Typical features include full or partial fairings and practical rider and pillion seating with low to medium ride handlebars. Tend to have medium to large capacity engines.

SuperSport

These machines are designed to mimic or directly replicate racing bikes. They normally have full fairings and low handlebars and are sometimes referred to as 'race replicas'.

Scooters

Have an engine, as an integral part of the rear suspension or the chassis is a step-through type, irrespective of cc or wheel size. Includes all types of transmission.

Touring

Bikes generally have large engines and are designed for long-distance riding. Typical features include a more comfortable seating position for rider and pillion, luggage carrying capability and weather protection, such as fairings with a fixed or adjustable windscreen.

Trail/Enduro

These bikes encompass trials, enduro and trail bikes with an off-road or cross-country capability.

Mopeds

In law, a motorized two-wheeled vehicle with an engine capacity of less than 50cc and a maximum speed capability of 30mph, riders must be aged 16 years or over. Mopeds are available in Motorcycle and Scooter styles.

Motorcycle

In law, a motorized two-wheeled vehicle that is not a moped, riders must be aged 17 years or over.

Powered Two Wheeler

All types of two-wheeled motor vehicle, including Mopeds, Motorcycles, Scooters, etc.

Source: MCIA (2004: 1)

Appendix B – Thesis Survey

Motorcycle Survey

1. What is the engine size of your main motorcycle? *The one you use most often.*

- Up to 50cc
- 51cc - 125cc
- 126cc - 250cc
- 251cc - 400cc
- 401cc - 600cc
- 601cc - 800cc
- 801cc - 1000cc
- More than 1000cc

2. What are the main reasons why you use your bike? *Select up to three options.*

- To Avoid the congestion charge
- Quickest way to travel
- Prefer not to use public transport
- Easier to park
- Enables me to beat congestion
- I use my bike for work
- Cost
- Other

3. How fuel efficient is your bike?

- Less than 30mpg
- Between 30 and 40mpg
- Between 40 and 50 mpg
- Between 50 and 60 mpg
- More than 60mpg

4. Do you have a car?

- Yes
- No

5. How often do you use a bike?

- More than once a day
- Once a day
- Five to ten times a week
- Two to four times a week
- Once a week
- One to three times a month
- Less than once a month

6. How often do you use a car?

- More than once a day
- Once a day
- Five to ten times a week
- Two to four times a week
- Once a week
- One to three times a month
- Less than once a month
- Never

7. Which of the following do you use? *Select as many as necessary.*

- Energy Saving Lightbulbs
- Water-saving taps
- Composting
- Doorstep recycling
- Municipal recycling depot
- Rainwater recycling

8. How concerned, if at all, are you by the following?

	Not concerned at all	Not concerned	Fairly concerned	Very concerned
Road transport pollutes the atmosphere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My motorcycle wastes non-renewable resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Global warming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Which of the following statements comes closest to your view?

- I don't care about the environment
- By riding a bike I am doing something positive for the environment
- I could do more for the environment

10. In general, do you regard yourself as environmentally friendly?

- Yes
- No

11. Do you live in London?

- Yes
- No

12. Do you work in London?

- Yes
- No

13. Do you use your bike to get to work?

- Yes
- No

14. If you have any comments you would like to make, please add them in the box below.

Thank you for your time completing this questionnaire. The results will be held in accordance with the provisions of the Data Protection Act, and will be used to help Gerard Livett with his MPhil thesis on the contribution motorcycles can make to Sustainable Transport. No information relating to the identity of the respondents will be recorded.

Appendix C – MAG survey

Parking in Soho/West End Survey

1. What are your main reasons for parking in Westminster? *Select up to three options.*

- I work in Westminster
- For work or business (meeting/courier)
- Shopping
- Health services (doctor, dentist)
- To Visit friends/family
- Entertainment/dining
- Study
- Tourism
- Other

2. What are the main reasons why you use your bike to go to Westminster? *Select up to three options.*

- To Avoid the congestion charge
- Quickest way to travel
- Prefer not to use public transport
- Easier to park
- Enables me to beat congestion
- I use my bike for work
- Other

3. How far do you travel from your home to your parking space in Westminster?

- Less than one mile
- 1 to 5 miles
- 5 to ten miles
- eleven to twenty miles
- greater than twenty miles

4. How long does it usually take to find a parking space in Westminster?

- Straight away
- Less than ten minutes

- Ten to twenty minutes
 Greater than twenty minutes
5. What time do you arrive at your parking bay?
- Before 8am
 Between 8 and 9am
 Between 9 and 10am
 Later / Other times
6. Have you ever decided not to come to Westminster because you won't be able to park?
- Yes
 No
7. How often do you park in Westminster?
- More than once a day
 Once a day
 Five to ten times a week
 Two to four times a week
 Once a week
 One to three times a month
 Less than once a month
8. If you park more than once a day, how many times do you park a day?
-
9. In the last month, which of the following locations have you used for parking your bike? *Select as many as necessary.*
- In a motorcycle bay
 In a pay and display bay
 In a meter bay
 On a single yellow line
 On the pavement
 In a car park
 In a private off-street area (not footway)
 Other
10. How concerned, if at all, are you by the following when you park your bike on the street in Westminster?

	Not concerned at all	Not concerned	Fairly concerned	Very concerned
Your Bike will get damaged	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your bike will get stolen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your bike will get a parking ticket	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Which of the following statements comes closest to your view?

- The level of motorcycle parking provision in Westminster should decrease
- The level of motorcycle parking provision in Westminster is about right
- The level of motorcycle parking provision in Westminster should increase

12. Would you be prepared to pay for individual motorcycle parking bays?

- Yes
- No

12a. If you answered **yes** to question 12 how much would you expect to pay, given that cars pay £1 for 15 minutes?

- About 25p for 15 minutes
- About 50p for 15 minutes
- About 75p for 15 minutes
- About £1 for 15 minutes
- About £1 for a day
- About £2 for a day

13. Would you be prepared to pay if ground anchors or hitching rails were provided?

- Yes
- No

14. If secure parking were provided, how much would you be prepared to pay?

- About 25p for 15 minutes
- About 50p for 15 minutes
- About 75p for 15 minutes
- About £1 for 15 minutes
- About £1 for a day
- About £2 for a day

15. When you park in Westminster, do you usually park all day?

Yes

No

16. Do you think there should be different parking bays for those who want to park all day and those who only want to park for up to two hours?

Yes

No

17. Which, if any, of the following do you use to protect your bike? *Select as many as applicable*

Alarm

Immobiliser

Disk lock/D lock

Chain and padlock

18. If a congestion charge was brought in for motorcycles, how likely would you be to use other forms of transport instead?

Very Likely

Fairly likely

Not very likely

Not likely at all

19. If you answered 'Other' to any of the questions above, or have any comments you would like to make, please add them in the box below.

Thank you for your time completing this questionnaire. The results will be held in accordance with the provisions of the Data Protection Act, and will be used to formulate the Motorcycle Action Group's response to Westminster City Council's review of motorcycle parking in Soho and the West End. No information relating to the identity of the respondents will be recorded.

Appendix D – Motorcycle Parking Rules

The parking rules for motorcycles vary across London. Some require motorcycles to have permits in residents' bays, while others permit free parking of any motorcycle in such bays. Some also permit motorcycles to park free-of charge in pay and display bays, while others motorcycles to pay, despite the difficulties involved in displaying a ticket. All boroughs, apart from the London Borough of Barking and Dagenham, provide solo motorcycle bays.

A summary of the rules is presented below.

Borough	Resident's Bay	Pay and Display	Metered Bay	Shared Use (Residents & P&D)
Barking & Dagenham	Free Parking	Free Parking	None	Free Parking
Barnet	Free Parking	Free Parking	None	Free Parking
Bexley	Permit required	Free Parking	Payment Required	Free Parking
Brent	Permit required	Free Parking	Payment Required	Free Parking
Bromley	Permit required	Payment Required	Payment Required	Payment Required
Camden	Permit required	Payment Required	Payment Required	Payment Required
Croydon	Permit required	Payment Required	Payment Required	Payment Required
Ealing	Free Parking	Free Parking	None	Free Parking
Enfield	Permit required	Free Parking	None	Free Parking
Greenwich	Permit required	Free Parking	Free Parking	Payment Required
Hackney	Free Parking	Free Parking	None	Free Parking
Hammersmith & Fulham	Free Parking	Free Parking	Free Parking	Free Parking
Haringey	Free Parking	Free Parking	None	Free Parking
Harrow	Permit required	Payment Required	Payment Required	Payment Required
Havering	Permit required	Payment Required	Payment Required	None
Hillingdon	Free Parking	Payment Required	Payment Required	Free Parking
Hounslow	Permit required	Payment Required	Payment Required	Payment Required
Islington	Permit required	Payment Required	None	Payment Required
Kensington & Chelsea	Permit required	Payment Required	None	None
Kingston	Free Parking	Payment Required	Payment Required	Free Parking

Lambeth	Permit required	Payment Required	Payment Required	Payment Required
Lewisham	Free Parking	Free Parking	None	Free Parking
Merton	Free Parking	Free Parking	Payment Required	Free Parking
Newham	Free Parking	Free Parking	Free Parking	Free Parking
Redbridge	Permit required	Payment Required	Payment Required	Payment Required
Richmond	Free Parking	Free Parking	Payment Required	Free Parking
Southwark	Permit required	Payment Required	Payment Required	None
Sutton	Permit required	Payment Required	None	Payment Required
Waltham Forest	Free Parking	Free Parking	None	Free Parking
Wandsworth	Free Parking	Payment Required	None	Free Parking
Westminster	Permit required	Payment Required	Payment Required	Payment Required

Source: <http://www.motorcycleparking.com>

Appendix E – Historic Driving Licence restrictions

Driving Licence Restrictions for Motorcycles and historic data.

Pre-1960	Minimum age 16. No restriction on size of machine, no time limit to taking test. No requirement for rider to be accompanied. Test performed by static observer.
1960	Minimum age 16. Rider restricted to 250cc solo machine. No limit for motorcycle combinations. No requirement for rider to be accompanied. Test performed by static observer.
1971	Minimum age raised to 17 for motorcycles – no change to mopeds.
1973	Motorcycle Helmets compulsory
1982	Two part test introduced: first part off-road, second part on-road performed by static observer. Two year limit for provisional motorcycle licences (did not apply to full car licence holders)
1983	Learner motorcyclists restricted to 125cc solo machines. No limit for motorcycle combinations.
1986	Direction indicators compulsory for new motorcycles
1987	All new motorcycles fitted with UN/ECE regulation 13.05 approved brakes
1989	Accompanied Test introduced (examiner follows on own machine)
1990	Two-part test replaced. Novice riders required to complete Compulsory Basic Training (CBT) before riding on road. CBT requirement waived for holders of full car licence, although required before taking test. CBT certificate had no expiry, but provisional entitlement restricted to two years. Provisional motorcycle entitlement could not be applied for until expiration of a year (effectively amounting to a year 'ban' for riders who failed to pass the test within the two years.) Learners no longer permitted to carry pillion (previously a learner could carry a pillion provided the pillion held a full motorcycle licence)
1995	Directive 87/56/EU. Maximum noise level 82 dB.
1996	Theory test introduced
1997	Learner access to combinations removed, full car licence holders no longer exempt from requirement of holding CBT before riding on road. Full motorcycle licence includes 'light car' category. Full car licence no longer gives automatic provisional motorcycle entitlement. Direct Access introduced.
2001	Full car licence no longer gives automatic moped entitlement – required to be activated by CBT. One year learner ban removed.

- 2003 Congestion charging introduced (February)
- 2003 BikeSafe London introduced (April)
- 2004 Advisory Group on Motorcycling reports to government
- 2005 Publication of National Motorcycle Strategy (February)
- 2005 Publication of Institute of Highway Incorporated Engineers' *Guidelines for Motorcycling* (April)
- 2012? Three-stage access, with practical and theory tests at all stages. Full motorcycle licence no longer gives light car entitlement (required for tricycles) Potential discrimination against motorcyclists disabled through injury. At present, a motorcyclist may, if disability prevents use of a motorcycle, ride a tricycle, whether modified or not. Under proposed legislation they would be required to take the light car test – in a car.

Current Motorcycle Licence Categories

- A1 Light motorcycles Light motorcycles with a cubic capacity not exceeding 125cc and a power output not exceeding 11kW (14.6bhp). Minimum Age 17
- A Motorcycles up to 25kW (33bhp) and a power to weight ratio not exceeding 0.16kW / kg. Motorcycle combination with a power to weight ratio not exceeding 0.16kW / kg. Minimum Age 17
- A Any size motorcycle with or without a sidecar. Minimum Age 21 or two years from standard A pass
- B1 Motor tricycles / quadricycles, 3 or 4 wheeled vehicles with an unladen weight not exceeding 550kg. Minimum Age 17
- P Mopeds. Minimum Age 16