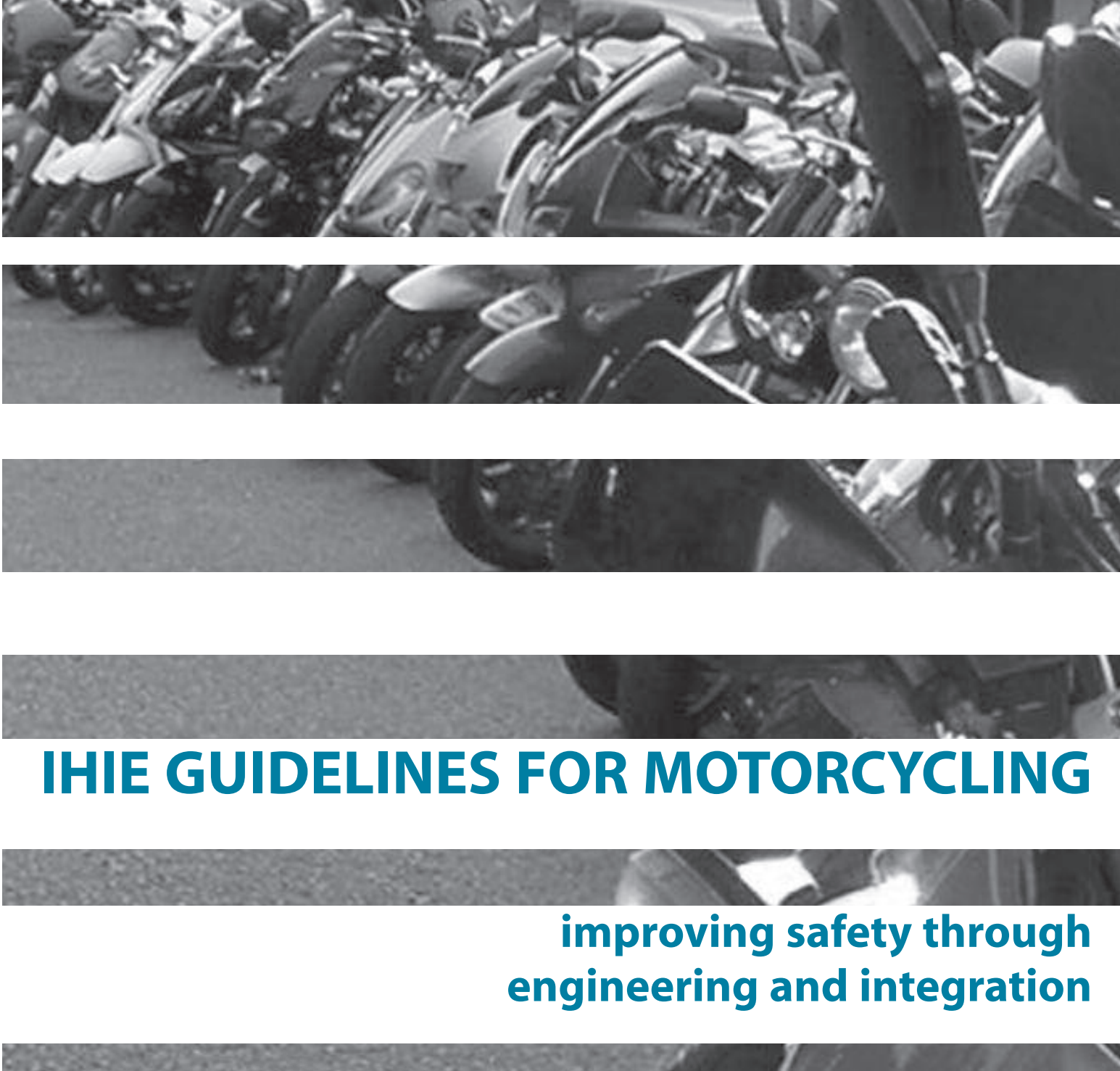




1965 - 2005

I H I E

**INSTITUTE OF HIGHWAY
INCORPORATED ENGINEERS**



IHIE GUIDELINES FOR MOTORCYCLING

**improving safety through
engineering and integration**

version 1.1

5.1 Key Points

5.1.1

- ❖ Motorcycling has grown to around 5% of motor vehicles in use.
- ❖ Motorcycle theft has also grown, approximately 37,000 machines per year.
- ❖ National policy and enabling regulations are firmly in place.
- ❖ Local demand can be difficult to assess, but relatively straightforward to satisfy.
- ❖ Effective motorcycle parking is “Near and Clear, Secure and Safe to use”.

5.2 Context



Demand exceeds supply.
MCIA.

5.2.1 Parking provision is an important tool in local transport policies as well as traffic management and crime reduction. It is also a fundamental requirement for any motorcycle user. Motorcycle parking can be provided on-street or off-street, in surface parking or multi-storey parking, by commercial site operators, local authorities, employers, retailers and colleges.

Demand

5.2.2 The Department for Transport’s (DfT) Compendium of Motorcycle Statistics shows that over the ten years since 1994, the total distance travelled by motorcycles grew 47% to 5.6 billion kilometres, while the number of motorcycles in use grew 57% to reach 1.52 million in 2003 - this represents around 5% of all motor vehicles (DfT 2004).

5.2.3 As motorcycling continues to grow, demand for parking has outstripped supply in many cases, especially during peak periods. A recent study of the London Congestion Charging area for Transport for London (TfL) found motorcycle on-street parking occupancy to be 33% over-capacity (Tilly 2004).

Crime reduction

5.2.4 Motorcycles are generally attractive to thieves because of their relatively low-weight and high-value. Motorcycle theft is often opportunistic and takes place in public places. Theft rates are generally highest in urban areas; police forces covering large urban areas record around three times the rate of theft (per thousand motorcycles) found in more rural areas. The City of London and Metropolitan police force areas have the two highest rates of motorcycle theft in England and Wales (Braun 2003). It is worth noting that just 7% of on-street parking in the TfL survey was equipped with anchor points (Tilly 2004).

5.2.5 Motorcycle theft is a continuing concern for riders, police, parking providers and insurers. Examples of constructive action include; “Lock It or Lose It” security awareness campaigning, “Sold Secure” and “Thatcham” product testing and rating standards, and the “Park Mark: Safer Parking Award” for operators aiming to protect customers and vehicles. The “Park Mark™” sign may be used on traffic signs but DfT authorisation is required.



Park Mark sign.
Park Mark.

5.2.6 An estimated 37,000 machines were reported stolen in 2000. The highest levels of theft are seen among the most popular machines. Mopeds and small motorcycles (typically 125cc learner machines) suffer theft rates around 50 per thousand registered, with 600cc and 1,000cc machines recording rates in excess of 10 per thousand (Braun 2003)

Policy background



On-street parking bay.
MCIA.

5.2.7 Prior to the development of Local Transport Plan (LTP) guidance, there was little national recognition of the need to provide for motorcycle users - other than the general requirement under the Road Traffic Acts to provide a safe and efficient highway network for all road users. The Road Traffic Regulation Act 1984 was amended in 2000 to extend local authority powers to provide devices for securing motorcycles and the Traffic Signs Regulations and General Directions (TSRGD), revised in 2002, provide specific signs and markings for bays. Details are contained in the Traffic Advisory Leaflet *TAL 2/02 Motorcycle Parking* (DfT 2002).

5.2.8 The policy impetus for motorcycle parking provision is clearly stated in DfT guidance on LTPs and, following the recommendations of the Government Advisory Group on Motorcycling, through the development of a National Motorcycle Strategy (AGoM 2004).

5.2.9 *PPG13: Transport* advises local authorities to consider appropriate provision for motorcycle parking, with additional specific consideration of providing attractive motorcycle parking at Park and Ride sites (DTLR 1994). How many parking opportunities should be available, where to locate them, the level of security to build-in, how to deal with accessibility issues and funding, will obviously vary from case-to-case.

5.3 Assessing Demand

5.3.1 Motorcycle use is characterised both by its flexibility and seasonality, so demand for parking and the most appropriate means of meeting that demand can be difficult to assess.

5.3.2 As noted in *TAL 2/02*, few authorities base motorcycle parking decisions on specific data for motorcycle movements. Although this may be available from classified traffic counts or origin and destination surveys there is unlikely to be a large body of data to work from. Traffic accumulation surveys based on existing traffic counts depend on the ability of automatic traffic counters to discriminate motorcycles, whilst the results from occasional manual counts may be sensitive to random variations given the relatively low volume of motorcycles in many areas.

5.3.3 Unsolicited user requests and opportunistic inclusion in other traffic schemes or development works seem to be the most common method of provision. Some authorities and other organisations have taken a more pro-active approach by seeking users' suggestions, often through a motorcycle forum (see Chapter 2). Understanding the nature of motorcycle use in an area is essential to making good use of parking resources.

5.3.4 Indications of the potential for and dynamics of motorcycle parking demand can be taken from national data contained in the DfT's *Compendium of Motorcycle Statistics* (DfT 2004):

- ❖ Mid-year estimates for 2003 show 1.52 million motorcycles in use, around 5% of all motor vehicles.
- ❖ National Travel Survey data for the period 1996-2003 show 72% of motorcycle journeys are conducted for work, business, education or shopping.
- ❖ Motorcycle parking patterns vary according to season and weather conditions, activity between November and March being around 40% lower than average.
- ❖ During favourable weather, individual riders will travel far more frequently than the annualised average of 8.3 trips per week - perhaps closer to the average car driver frequency (16.8 per week).



Parking outside college.
MCIA.

5.3.5 Locations at and around educational establishments and workplaces, within or surrounding shopping and entertainment/leisure areas, at transport interchanges, or within residential areas lacking private parking opportunities will therefore be in demand.

5.3.6 As with general growth in leisure use among all modes, leisure use by motorcyclists often involves attending evening or weekend events - often motorcycling-related. Some locations, especially if leisure use is the main attractor, will therefore experience high demand for parking at weekends. Other locations will experience high demand during general business hours, but may see far lower demand for evening leisure and shift work.

5.3.7 Look out for clear signals of under-supply: illegal or inappropriate parking, machines secured to street furniture, unauthorised use of cycle parking, overflow at motorcycle parking bays, obstruction to traffic, and complaints from residents, businesses or riders. It will be important to survey a wide range of locations and at appropriate times to get a meaningful picture.



Poor provision will lead to informal or inappropriate parking.

5.4 Motorcycle Rider Parking Behaviour and Requirements

5.4.1 In terms of convenience, flexibility and security considerations, motorcycles are often more like bicycles than cars. Consequently, the behaviour and requirements of motorcyclists often follow the cycle parking model with motorcyclists looking for similar features. Motorcycle riders will look for obvious parking opportunities close to their destination, choosing convenient places, ideally where they can secure their machine to something immovable, or where they can see or stay close to their machine or at the very least where it is likely to receive maximum casual observation so the risk of theft can be minimised. A distance of 20 metres is desirable and facilities more than 50 metres from the destination will compete with unofficial opportunities closer to hand.



Covered parking.
MCIA.

5.4.2 Covered off-street parking is desirable. This offers protection from the elements and other causes of inconvenience or damage to parked motorcycles - tree debris, sap and bird waste. Many motorcycles do not have large load spaces that can be secured, so riders value the provision of secure places to stow cumbersome and expensive riding equipment such as protective helmets and clothing. Riders have less opportunity to carry food or drink so access to litter bins and vending machines is also worth considering.

5.4.3 Clearly-signed, convenient and secure parking reduces the attraction of informal parking. On the other hand inadequate provision will lead to exploitation of inappropriate opportunities which may result in motorcycles causing a genuine obstruction or hazard to others. Marginal areas, especially those already utilised by riders, can be formalised using relatively low-cost measures to protect parked machines and other road users.



Above and below:
Marginal area converted to formal parking.
MCIA.

5.4.4 Motorcycle parking within multi-storey car parks is best provided as a dedicated area within sight of attendants ideally on the ground floor at or near the entrance/exit in order to avoid using the ramps and circulation areas.

5.4.5 Good practice in motorcycle parking can be summarised as "Near and Clear, Secure and Safe to use":

- ❖ **Near:** Motorcycle users will naturally look for parking opportunities close to their destination, simply because the relatively small size and high flexibility of the motorcycle allows easy progress through traffic and exploitation of marginal parking opportunities without causing obstruction.
- ❖ **Clear:** Any difficulty in finding a suitable formal parking area will tend to reduce the advantages of motorcycle use. Signing from main routes and on-site is important so riders can find formal facilities. TAL 2/02 explains the provisions for making orders and for signing.
- ❖ **Secure:** Physical security measures will be a strong attractor for most riders needing to park for more than a few minutes. Casual users, motorcycle tourists and others unfamiliar with the area are likely to find the prospect of secure parking very attractive.





Near, clear, safe to use.
MCIA.

- ❖ **Safe to use:** Personal safety considerations when using a parking area start with the surface on which the machine has to be manoeuvred and mounted/dismounted, as well as seclusion, lighting, CCTV coverage and the amount of passing pedestrian traffic.

5.5 Identifying Motorcycle Parking Resources

5.5.1 It is good practice to maintain a definitive map showing all current public motorcycle parking locations, linked to data listing their dimensions, capacity, and security provisions within each authority. Identifying the number, location and type of existing spaces is essential for objective planning and management, but could also form the basis of information for motorcycle users - for example a leaflet or web page including a map and useful contact details.



5.5.2 Motorcycle parking capacity is a function of the size of bay and size of machines that might be expected to use it. On-street motorcycle parking bays follow a similar lay-out to car parking bays, ranging in depth from 1800 to 2700mm (length varying according to circumstances) but with the motorcycles parked at right angles to the kerb rather than parallel. Motorcycle parking bays are generally not marked out for individual machines, allowing flexible and efficient use of limited space by machines of different sizes. Motorcycles range in length from around 1900mm for a moped to 2500mm for a large cruiser. In practice the manner of parking means that even the largest machines should be capable of parking across a 2100mm bay without encroaching into the carriageway.



Examples of parking bay use.
MCIA.



Parking bay. MCIA.

5.5.3 It is the effective width of a motorcycle and the need for sufficient space to mount/dismount from the side which will determine the usable area. Allowing for handlebars, mirrors or fixed luggage most machines range from 700-1000mm wide, although in practice most machines are parked with handlebars turned to the locked position which also reduces both width and length. With a nominal 600mm needed to mount/dismount, this suggests an



Wheels turned to park.
MCIA.



Overcrowding.
MCIA.

average effective width of around 1400mm per machine. Where there is a significant usage by smaller or larger machines this figure can be altered to suit.

5.5.4 These figures can serve as a guide to the total area needed to meet motorcycle parking demand, or as an indicator of capacity for existing or proposed facilities. Yet, where parking capacity is insufficient to meet demand, riders will try to fit into the available space. In the most extreme cases riders will manoeuvre machines so that there is no space on either side. Such informal parking makes for the most efficient use of space but it may not be possible for some riders to safely contend with this and damage or injury may result.

5.5.5 Parking occupancy and duration can only be reliably assessed by manual surveys, with observation frequency increased where short-term parking is common. Linking observations of time and machines present (including informal parking activity) to data on the dimensions of bays and motorcycles allows an objective judgement of how well demand is balanced against supply at different times and locations. Other information can be collected at the same time to help identify where security anchor points are required. The use of chains or other devices by riders will be readily apparent and these devices work best when securing a machine to a fixed anchor.

5.5.6 Motorcycle parking surveys can be split into three distinct functions:

- ❖ To create or update a motorcycle parking inventory - essential data will include location, dimensions (including capacity) and the presence of security features.
- ❖ To audit the quality and characteristics of a facility - surfaces, signs and road markings, anchor points, CCTV, lighting, apparent hazards, obstructions and other points needing attention.
- ❖ To investigate the characteristics of motorcycle usage - occupancy levels and duration, by day-of-week, time of year, weather conditions, extent and type security being used, the characteristics of riders (by interview) and/or their machines (by observation or interview).

5.5.7 Wider consultation with users and other interested parties is likely to produce better solutions by identifying unresolved issues and stimulating dialogue to resolve them. Some local authorities benefit from a regular motorcycle forum, or at least approach motorcycle representatives through more general transport consultation channels.

5.6 Practical Design Issues

5.6.1 A simple checklist of design considerations is included with these guidelines, but some practical design issues surrounding theft-reduction and personal safety deserve closer discussion.



Low continuous rail.
MCIA.



Low continuous rail as part of pedestrian guard rail.
MCIA

Security

5.6.2 Physical security need not be difficult or expensive to provide. Fixed and robust features such as rails, hoops or posts designed to provide a simple locking-point to secure a motorcycle using a chain or similar device should be an early consideration for any parking scheme. Dedicated CCTV may not be affordable or appropriate for many parking areas, although choosing locations that fall within already monitored areas may well be feasible.

5.6.3 A range of suitable designs exist for security anchors of varying sophistication. Where motorcycles are parked in bays with one wheel against the kerb, a simple continuous steel rail satisfies most situations. It has the advantage of being easily and inexpensively sourced and installed with overall costs similar to that for providing an equivalent amount of cycle parking.

5.6.4 The continuous rail allows for efficient use by machines of varying style and size, is well understood by users and is compatible with most types of shackling devices. The rail should be set at around 600mm above surface to accommodate the range of wheel sizes in use. The addition of a waist-height upper rail, or mounting to a wall as appropriate, prevents a tripping hazard.

5.6.5 Other designs, such as posts with captive chains (with or without a captive lock) have the advantage of assisting riders who do not carry a chain or locking device capable of securing their machine to fixed object.

5.6.6 Flush-mounted locking rings set into the floor or carriageway may not be obtrusive, but can be difficult or unattractive to users; they allow the mounting surface to be used as a levering point to break locks, are subject to debris and rain water, whilst moving parts can suffer wear and tear. They may also present a trip hazard and consideration should be given to injury risks, for example to visually-impaired pedestrians.

5.6.7 Generally speaking, sophisticated designs, with moving parts and locking mechanisms are more expensive to provide and maintain. Offsetting these costs by charging for secure parking is difficult to implement successfully. Simple ticket-based pay and display methods do not work well with motorcycles as there is nowhere to put the ticket securely on current designs of motorcycle. Pay and display and meter-based systems have the added disadvantage of alerting thieves to the likely time before a rider will return to their motorcycle.

Safety

5.6.8 This includes safety issues arising from the actual process of manoeuvring a motorcycle whilst parking, but also broader issues of personal safety at or around the parking place.

5.6.9 Motorcycle parking areas should have limited gradients to enable easy manoeuvrability and to ensure the motorcycle is unlikely to topple over. Parking areas must also be well drained and free of debris or contamination that might cause a manoeuvring

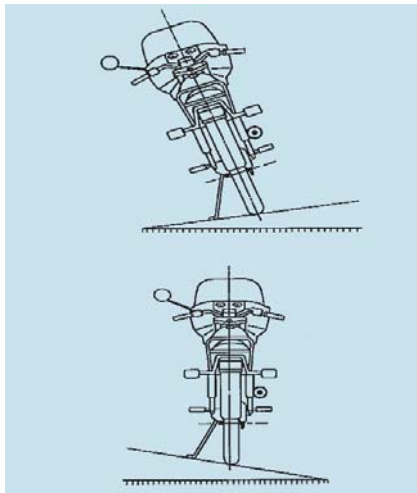


Figure 1a.
InterRegs.

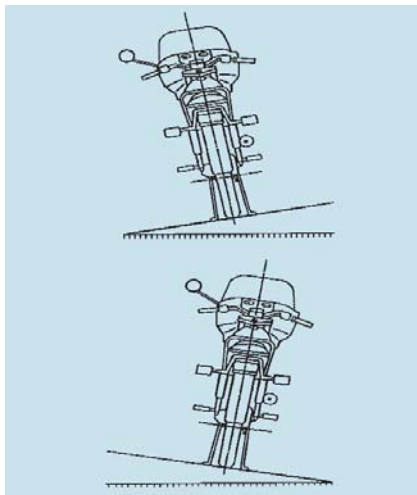


Figure 1b.
InterRegs.

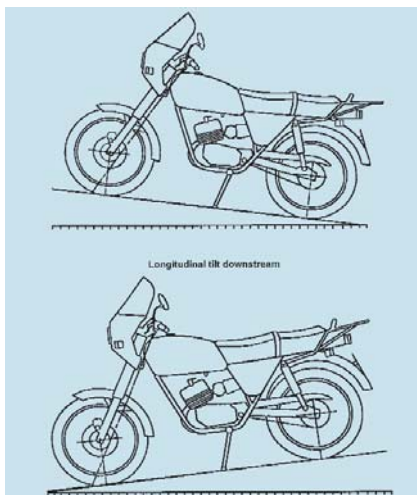


Figure 2.
InterRegs.

rider to lose their footing. Surfaces should offer good grip for feet and tyres.

5.6.10 European law requires all motorcycles to have at least one device able to maintain the machine in a vertical, or near vertical, parking position when left unattended. There are two main types of these devices:

- ❖ The “prop stand” provides a triangulating point of contact, along with the front and rear tyres, such that the vehicle leans to the left. Riders will generally use the “prop stand” for ease and convenience, or where parking on a camber.
- ❖ The “centre stand” provides two centrally positioned triangulating points such that the machine rests vertically, often with one wheel lifted from the floor. This usually requires more effort from the rider and is often less stable unless the parking area is level.

5.6.11 In each case the motorcycle will generally be parked with its steering locked in a left turn position.

5.6.12 Based on EU regulations for motorcycle stand performance, surface slope angles should be less than 5 degrees (EC 1993). Figures 1a and 1b demonstrate the extremes of motorcycle stand performance against a transverse tilt, while Figure 2 shows the effect of longitudinal tilt (both upstream and downstream).

5.6.13 As motorcycles are not fitted with a parking brake, the rider must be able to position their machine so that it cannot roll forward under its own weight and fall over. Therefore, where the ground is not level, riders will try to park so that the weight of the machine is working with the direction of the stand, usually with one wheel touching the kerb. In such cases, there must be sufficient space and visibility to manoeuvre the machine in and out of position safely. Even without a reverse gear, motorcycles are in most respects more manoeuvrable than larger vehicles and can cope with situations considered unsuitable for parking cars.

5.6.14 Parking areas must have a firm surface capable of supporting the weight of a motorcycle through its stand. The footprint of the stand might typically measure 10cm² and carry a load of 10kg per cm². The surface of the parking area must be capable of withstanding penetration by the stand. In the case of bitumen-based surfaces, care should be taken to ensure the surface remains solid during hot weather.

5.6.15 Sufficient space and visibility for riders must be present to allow manoeuvring without significant risk of conflict with other road users. On-street parking should not be positioned so that riders are tempted to use footways in order to access it. Local authorities should also ensure safe and legitimate means of access to off-street parking, even where access is from the road onto private land.

5.6.16 Sites should be well lit and not located in secluded areas. Instead, designs should provide light, open spaces, without high walls or dense planting to provide cover for thieves.

5.7 Parking Standards and Dimensions

Parking standards

5.7.1 PPG13: Transport does not set specific standards for motorcycle parking, but many local authorities have published their own local motorcycle parking standards and guidance, and these are typically based on a proportion of car capacity (up to 5%) with a minimum provision (one or two spaces). The Motorcycle Industry Association (MCIA) has called for 5% of all publicly accessible parking spaces to be set aside for motorcycle use (MCIA 2001).

5.7.2 The British Motorcyclists' Federation (BMF) suggests minimum motorcycle parking standards for different types of development in their guidance notes:

Description of Land Use	Minimum Motorcycle Parking Standard
Camping Sites	1/4 Staff, 1/10 Pitches
Marinas	1/4 Moorings
Car Parks	1/10 Parking Spaces
Park and Ride Sites	1/10 Parking Spaces
Rail Stations	10/Morning Peak Service
Bus Stations	4/1 Bus Bay
Key Bus Stops	4/Stop
Hospitals	1/4 Staff, 1/20 Beds

Source: BMF.

5.7.3 TAL 2/02 Motorcycle Parking links journey purposes to length of stay:

Length of Stay	Typical Uses
<30 minutes	Shopping Dropping passengers off Delivery
30 minutes - 1 hour	Shopping Leisure Personal business
1-3 hours	Shopping Employment Leisure
4 or more hours	Shopping Employment Rail or Bus use Education

Source: DfT TAL 2/02

5.7.4 In addition to indicating likely uses, it is also possible to suggest other attributes of motorcycle parking that might vary with length of stay. Broadly speaking, for short visits close proximity to destination will probably be the primary consideration, although even for short periods anchor points are desirable to reduce the risk of theft. For any visit longer than 30 minutes, while proximity remains important in the rider's choice of parking place, security features such as anchor points, regular monitoring and limited opportunity for theft by van will increase in desirability. Protection from weather and passing traffic also becomes more desirable for longer term parking.

Motorcycles - indicative dimensions

5.7.5 Motorcycle length and width dimensions are generally reduced when parked, as the front wheel will be turned to a locked position. It is this effective length and width that generally applies.

	Effective Length mm	Effective Width mm	Weight kg
Moped	1600	650	85
Middle-weight Motorcycle/Scooter	1900	800	230
Large Motorcycle	2300	900	350
95%ile (estimated)	2000	800	260

Source: MCI

5.7.6 Further information about dimensions, layouts and signing is drawn together in *A Guide to the Design and Provision of Secure Parking for Motorcycles*, available from the Motorcycle Action Group website.

5.7.7 A further consideration is that of disabled riders. The range of difficulties faced by disabled riders will be similar to those using other modes and the British Parking Association (BPA) suggests provision for disabled riders should also be provided by way of special marked-out bays of increased size. Any rider experiencing reduced mobility and strength will benefit from extra room to position themselves to the side of the bike when manoeuvring or mounting. As the population ages, stiffness and reduced range of movement may well make this a more common issue.



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