



## Ergonomic requirements for accessible taxis

Increasing availability, comfort and safety for all passengers







## introduction

By 2020 close to half the adult population of the UK will be over 50 years old and the majority of Europeans can now look forward to 30 years of active life after 50. However, one in five of the adult population has a disability and nearly half (48%) of the disabled population is aged 65 or older with some 29% of the disabled population being aged 75 or more.

Almost all of us will suffer some disabling mobility impairment at some time in our lives and transport related regulations introduced under the DDA(1995) are intended to ensure that safe and convenient mobility is available to as many people as possible. Taxis play a critical role in the transport chain. They often provide the links between other forms of transport (rail, air, coach etc); modes which may now be accessible for those with mobility impairments. In many cases they may represent the only form of transport that can provide a door to door service. An improvement in the accessibility of taxis can therefore be expected to offer significant benefit to disabled travellers making a wide range of journey types.

The advice provided in this guide is based on a programme of ergonomic research undertaken to provide a definition of the requirements of a taxi designed to be fully accessible.

The principal barriers to using taxis for many people with mobility impairments are connected with the need to step up to and into the passenger compartment, negotiate a door with low head clearance and then access a seat which may be either low or set some distance back from the door. Physical frailty and stiff or painful joints may make all of these formidable challenges. Wheelchair users face a different set of challenges associated with the widespread use of ramps.

The recommendations summarised in this leaflet are intended to lead to taxi designs which are more accessible by reducing the difficulties of getting in and out and using the seats comfortably and conveniently.







## ramps

A steep ramp can make accessing a taxi difficult for wheelchair users, it may also represent a hazard for their assistants and taxi drivers. An ideal design would involve level entry from the kerb. If a gradient is required it should be less than 7°. Ramps should not provide an obstacle for pedestrians on the pavement and their length should be restricted to 1000mm. It is also important that ramps have a safety lip (50mm), are the same width as the door opening and comprise a single non-slip surface. Their edges should be highlighted to reduce the risk of trips.



## steps

Some people cannot manage even a single step and may need a ramp with a gentle gradient if level entry isn't possible. If steps are necessary they should be restricted to a single step that is 100mm high. The steps should be the width of the door entry and be closed at the back without an overhang to reduce the risk of tripping.



## doors and door apertures

Narrow doors and a low head clearance can cause significant difficulties for ambulant passengers and wheelchair users. A door width of at least 850mm will provide adequate clearance for wider wheelchairs and walking frames. A door height of 1595mm is required to prevent painful stooping and to minimise the risk of a head strike for passengers with visual impairments.

While hinged doors can provide a valuable form of support for passengers entering or leaving a vehicle, opening and closing them from the inside can be difficult for seated passengers and larger doors become a potential hazard for pedestrians on the pavement. Sliding doors can provide a large opening but secure latching must be ensured. Powered closure is now available in some vehicles and, if under the driver's supervision, this may provide an effective solution. Sliding doors are often associated with more

generous door apertures but care must be taken to ensure that opening and closing efforts are kept below 70N. Again, powered closure may provide an effective solution.

There are advantages and disadvantages associated with wheelchair access from the side and rear of a vehicle. Side access does not require wheelchairs to negotiate a kerb or enter the carriageway and enables shallower ramp angles from the pavement. Rear access may be the most practicable means of access in non-urban environments. It may also enable simpler manoeuvres to a secure travelling position inside the vehicle but may not be possible from a taxi rank or kerbside. The requirements outlined above (ramps and door size) are applicable in both cases.



## passenger compartment

An interior roof height of at least 1625mm (ideally 1825) is required. If internal space is limited then it is important that passengers can access seats as directly as possible from an entrance. If there is a more generous provision (as when wheelchairs can also be accommodated in front of the passenger seats) it is important that there is sufficient internal height to prevent the need to stoop. Adequate provision of grab handles is an important requirement in either case.

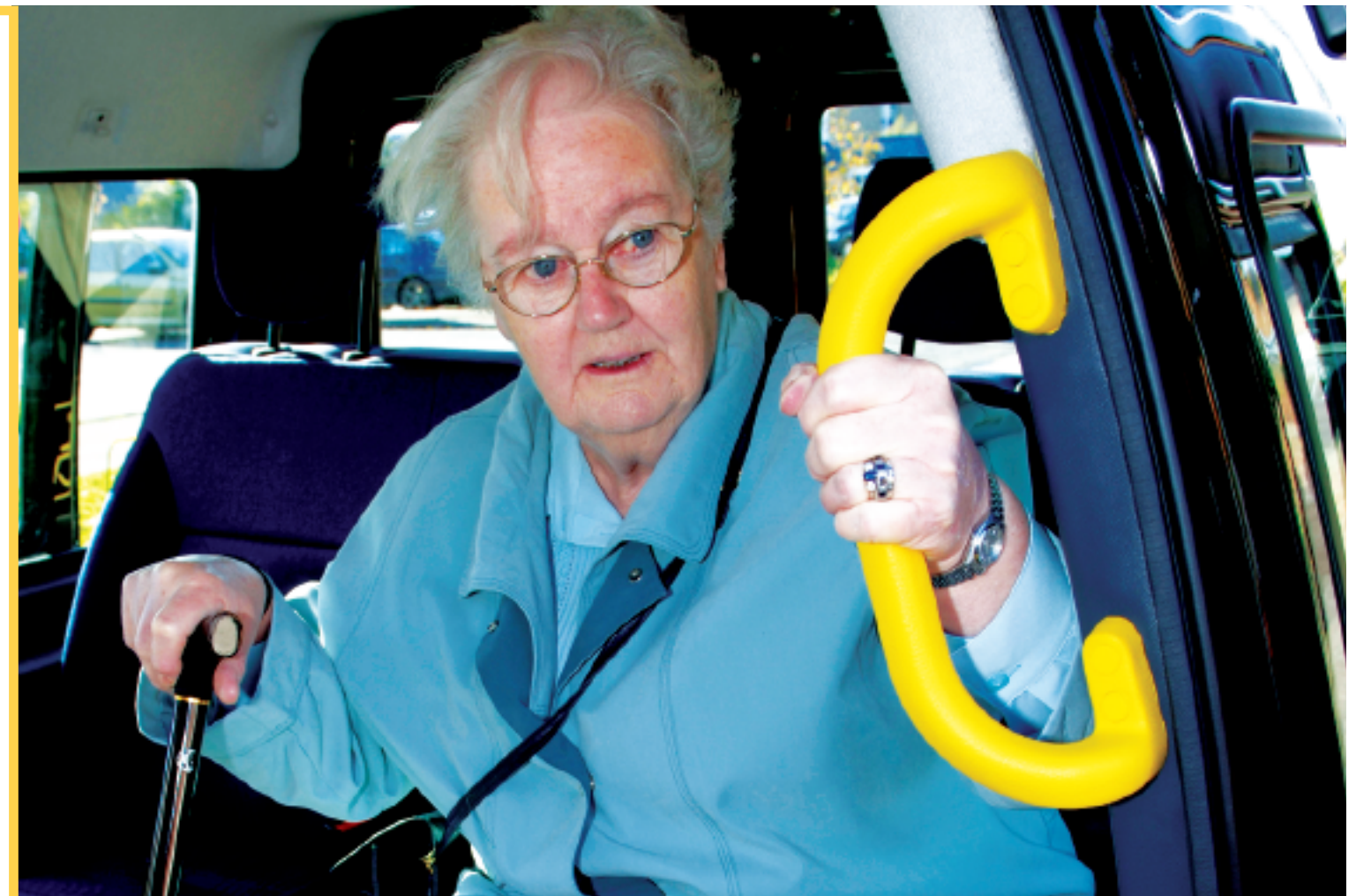
Manoeuvring space measuring' to identify that this research is referring to manoeuvring space only and has not

## seating

As low seats can be difficult for passengers with stiff or painful joints to use seat heights need to be between 430mm - 460mm from the floor and the squab should not have a pronounced angle. In order to accommodate passengers with limited leg flexibility a space of at least 1176mm between the seat back and any forward obstruction is required. A swivel seat (preferably powered) can provide a valuable

considered the kinematics of a wheelchair occupant during a vehicle impact at least 1300mm by 1340mm is required. This assumes that the wheelchair will be carried facing backwards and there is a side entrance. If the wheelchair is to face forwards then a slightly larger manoeuvring space is required. The position of the side door affects the manoeuvring space required and for forward facing carriage the manoeuvring space is minimised if the door way is set back from the main bulkhead.

alternate means of entry for passengers who find even a low single step difficult to negotiate. It is important that such seats provide a sense of security for the passenger while they are in operation and that they are large enough to provide a secure and comfortable ride.



## handles and grab handles

Door handles that allow the passenger to use their whole hand to exert leverage and a range of opening strategies are preferable. Handle operation and latching efforts should be minimised to assist passengers who have limited upper body strength.

Grab handles play an important role in supporting access and providing stability support whilst passengers are inside a vehicle. The precise location will be dependent on the design of the vehicle and, in particular, the means of entry (i.e. step, ramp, swivel seat etc). Handles should have a diameter of 40mm and surface clearance of 45mm. For standing passengers (travelling in other modes of public transport) a height of around 900mm is recommended. However, lower positioning is more appropriate for handles in taxis intended to assist passengers getting up from seats or children climbing into a vehicle. Horizontal handles are more helpful inside a vehicle but vertical handles are recommended for doorways.







## visibility and lighting

For passengers with impaired vision feature and edge high-lighting can provide important assistance. The following features should be visually emphasised: exterior and interior door handles, step and ramp edges, door edges and door apertures, grab handles, seat edges and facilities provided to allow communication with the driver.



Ambient lighting within the passenger compartment should be at least 150lux but higher levels of illumination may cause distraction for the driver and adaptation problems for some passengers alighting into a dark street. Brighter feature lighting (>200lux) is recommended for steps, the meter display and the communication window. In all cases lighting sources should be positioned so as to prevent shadowing.

### For further information please contact:

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