

Improving disabled access in transport infrastructure

Major infrastructure projects in Europe are increasingly integrating the requirements of persons with reduced mobility into the early stages of their design. For example, significant investment is earmarked for step-free access for a number of major surface stations within the Crossrail West scheme on the outskirts of London. New lifts and overbridges are being planned by Network Rail, in order to facilitate access to all platforms in stations such as West Drayton and Maidenhead. Such infrastructure works will benefit a wide range of people including mothers with prams as well as a wide range of people with disabilities.

The definition of disability is wide and encompasses persons of limited mobility, hearing and vision. It includes the elderly, infirm and wheelchair users. The infrastructure and facilities provided by transport networks should therefore go further than just providing wheelchair access, and should include aural and visual information systems, including induction loops; appropriate warning surfaces at the top and bottom of stairs and at platform edges; and alternative access arrangements where physical barriers make it impossible or difficult to use the service.

Considering the aging nature of European societies, the proportion of people with disabilities is significant and rising. For example, it is currently estimated that 4,600,000 people have walking difficulties in the UK, and 800,000 of these people use a wheelchair. In addition, around 9,000,000 people in the UK have some degree of hearing loss. Consideration of the needs of disabled passengers is therefore

necessary in order to address the requirements of a large proportion of the population.

However, the provision of improved access to transport infrastructure for disabled passengers comes with a significant price-tag.

In the current economic climate of public sector austerity, plans for a number of step-free access programmes have had to be delayed. For example, a number of step-free station schemes have had to be deferred by London Underground due to budget constraints. However, more stations will become step-free over the coming years as major redevelopment work is undertaken at key stations in London, including major interchanges such as Farringdon, Victoria and Tottenham Court Road.

Investments in step-free access and mobility support are expressions of public policy to encourage the integration of disabled



Wembley Central Station – new central entrance

Photo Credit: Network Rail/Wagstaffs Design

persons as active participants in social and economic activity. In London, the Mayor is committed through his Transport Policy to making public transport and the pedestrian environment accessible to everyone, especially people with disabilities. In addition to public policy, a number of international, European and national legal guidelines require an elimination of discrimination against people with disabilities, and such guidelines are increasingly having greater effect.

The UN Convention on the Rights of Persons with Disabilities calls for 'reasonable accommo-

are required, the UK's Equality Act 2010 requires service providers to consider whether the current arrangements put people with disabilities at a 'substantial disadvantage'; the 'physical features' that contribute to any disadvantage that people with disabilities may experience; and the nature of any 'reasonable adjustment' that may be required in order to overcome any substantial disadvantage. Reference to substantial disadvantage is a new and more onerous requirement, compared to the UK's Disability Discrimination Act 1995, which has mostly been repealed. Previously,

thirds of the UK's rail network is currently on the TEN, and therefore comes within the ambit of these standards. However, licensed railway operators can apply for a dispensation for minor alterations of existing infrastructure, or for derogation in respect of major works.

Having encouraged people with disabilities to use transport infrastructure by providing them with accessible infrastructure, how safe would such people be in case of a fire? By definition, people with disabilities are not as mobile as able-bodied persons, and may face challenges in trying to escape. This issue is



Chadwell Heath Station – new accessible lifts

Photo Credit: Network Rail/Wagstaffs Design

dition' by modifying existing infrastructure without imposing a disproportionate cost, as well supporting 'universal design' to enable usage by all people. In Europe, discrimination on the basis of disability is outlawed by the Charter of Fundamental Rights of the European Union, which calls for the integration of persons with disabilities within the life of the community. In the UK, disability discrimination is prohibited on the basis of the Equality Act 2010, which requires 'reasonable adjustments' in order that people with disabilities can overcome any 'substantial disadvantage'.

In order to judge whether such measures

adjustments to premises had to be made by service providers only where it would otherwise be 'impossible or unreasonably difficult' for person with reduced mobility to use the service. This means that service providers in the UK may have to make more adjustments to satisfy the Equality Act 2010.

In the context of railway networks, the European 'Technical Specifications for Interoperability: Persons with Reduced Mobility' set a number of standards where new trains or stations are introduced, or where trains or stations undergo major work within the Trans-European Network (TEN). Around two-

particularly acute in tunnels and underground systems, where the spread of fire and smoke may limit the time available for safe evacuation. Means of rapid detection of any fire, providing timely and accurate information to travellers, and quickly moving people with disabilities to a place of safety are essential in such scenarios. Such considerations apply to both rail and road transport networks.

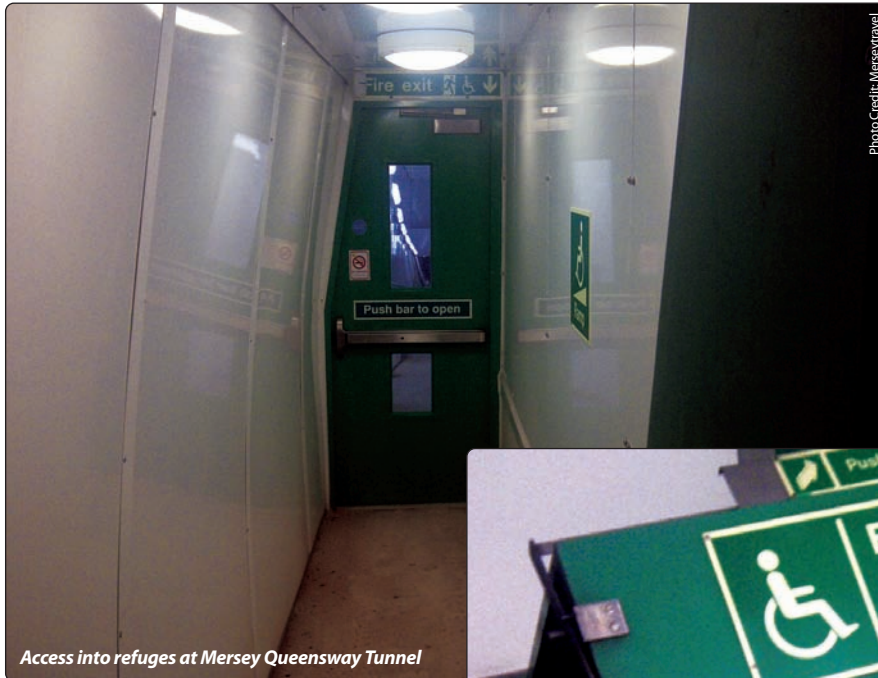
Many road tunnels are constructed to overcome natural obstacles such as rivers, and must therefore include gradients at both ends, to enable a tunnel to adequately clear such obstacles. Such gradients may pose a challenge

to manual wheelchair users, who may find gradients above 2.5% difficult to overcome. The provision of safe escape routes at regular intervals of a tunnel is therefore very important, particularly for people with disabilities.

radio break-in facilities, which allow instructions to be provided to motorists in case of an emergency. Emergency way-finding signage, flashing beacons and directional sounders are also provided, to direct motorists to the nearest

cases, evacuation via trains may be the only reasonable alternative.

The provision of adequate infrastructure facilities for people with disabilities in transport networks is a challenge, whose full implications go far beyond providing wheelchair access. The social and economic integration of people with disabilities through investment in accessible transport systems is certainly expensive, but can be justified from both moral and economic perspectives. It makes no sense to preclude a large and increasing proportion of the European population from active participation in society, merely because of inadequate transport facilities. Fortunately, solutions are available that are now being adopted to provide accessible transport for people with disabilities in road, rail and metro networks.



Access into refuges at Mersey Queensway Tunnel

Within the context of a refurbishment project, seven refuges at 200m-spacings with wheelchair access have been constructed underneath the roadway within the Mersey Queensway Tunnel. These refuges enable motorists to leave their cars in case of a serious emergency and wait in safety, until the incident is over, or until they are rescued by the fire brigade. The design of the refuges include ramps from the road deck down to the tunnel invert of descending gradient of 1 in 8, which can be negotiated on an ascending gradient given the help of an able-bodied assistant. The ingress of smoke into the refuges is precluded through mechanical pressurisation using fresh air. Similar solutions are currently being considered for older tunnels which have no ready means of egress in case of a serious incident.

Apart from infrastructure works, effective means of influencing human behaviour during an incident is a key tool to support evacuation. Experience from serious tunnel incidents such as the Mont Blanc tunnel fire in 1999, as well as full-scale experiments, indicates that users prefer to stay within their vehicles, rather than evacuate the tunnel. This has led to multiple fatalities, since cars do not provide motorists with any protection against smoke or fire. The Mersey Tunnels (Kingsway and Queensway) provide

refuges. The combination of visual and aural way-finding technologies is helpful for able-bodied motorists, and is particularly useful for people who may have impairment to one or more of their senses.

In the case of rail and metro tunnels, evacuation of people with disabilities would normally be arranged along a walkway, or alternatively along the tunnel floor (assuming no risk with respect of third-rail power supplies). However, many existing rail tunnels do not have any walkways, and the presence of a ballasted track may make it difficult for the movement of any wheelchairs. In such



Emergency evacuation chair provided at refuges in Mersey Queensway Tunnel

Photo Credit: Merseytravel

BIOGRAPHY



Dr Fathi Tarada is a leading expert in fire safety engineering, tunnel ventilation and Computational Fluid Dynamics, with design, review and operations experience in tunnels and buildings worldwide. Fathi is also Managing Director of Mosen Ltd and Chief Executive of HBI Haerter Ltd. He is the inventor of the MoJet® tunnel ventilation system and has submitted a dozen patent applications in the field of mechanical engineering. Fathi is the Secretary of the World Road Association (PIARC) Technical Committee on Road Tunnel Operations, the Chairman of BHR's International Symposium on Aerodynamics, Ventilation and Fire in Tunnels, and the Chairman of the Fire Protection and Safety in Tunnels Conference.