The Accessibility of Urban Transport to People with Reduced Mobility

Final Report

Prepared by

Berliner Verkehrsbetriebe (BVG)
Anstalt des öffentlichen Rechts

for

DG Energy and Transport
European Commission
The Accessibility of Urban Transport to People with Reduced Mobility

Final Report

The findings, conclusions and interpretations expressed in this document are those of Berliner Verkehrsbetriebe (BVG) alone and should in no way be taken to reflect the policies or opinions of the European Commission.

This report has been prepared by Berliner Verkehrsbetriebe (BVG). Contributors to the study: Michael Grunwald, Inês Löff Barroso, Andris Mamis, Andrea Neumann and Jürgen Senst.

2003
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Synopsis

The aim of this study has been to provide an overview of the situation in the European Union with regard to the accessibility of people with reduced mobility (PRM) to urban transport. The study has focused on developments in the individual Member States and in the European Union as a whole, in making public transport more accessible to Europe’s citizens in terms of technology, legislation and in socio-economic terms.

The term “people with reduced mobility” covers a very broad spectrum of citizens including people with permanent mobility restrictions due to physical or psychological disabilities, people with sensory disabilities and people of small or large stature. In addition, people can also be classified as PRM if they are over the age of 65 and below the age of 3. The term also covers an array of citizens with temporary mobility restrictions, pregnant women, those suffering from temporary illnesses or injuries and people with buggies or heavy luggage. Although there are no official statistics about PRM, the figure in the EU can be estimated at approximately 99 million or 26% of the population in 2000. With an ageing population this figure will continue to rise.

As there is no standard definition throughout the EU of “PRM” or “severe disability”, interpretations of the terms vary from country to country, and even within individual countries. This was reflected in discrepancies in figures provided by some of the respondents to the study survey of 32 cities in the European Union. Many of these discrepancies are also echoed in laws, provisions, statistics and even in the definitions of disability, thus making it difficult in some instances to obtain a clear overall picture of the situation in the EU and to achieve a common basis for making a direct comparison.

As it was not feasible within this study to investigate the situation in every city, town and village throughout the EU, the study selected a number of different sized cities, which were representative for each country, to participate in a survey aimed at investigating the complex theme of public transport accessibility for PRM. Questionnaires were developed and targeted at national administrations, national public transport associations and national disabled associations. Other questionnaires addressed municipal transport administrations, urban transit operators and municipal disabled associations. At the same time a separate survey was conducted among vehicle manufacturers and an assessment of legislation in the EU and in the individual Member States took place.

Out of the 77 cities which were approached during the study, and despite numerous reminders, only 32 cities could provide information about the services they offered for people with disabilities and their use. Therefore, useful comparisons and conclusions have only been possible to a limited extent. The information collected did, however, show that the factors influencing the services provided for PRM varied not only from country to country but also in some cases from city to city. Whether a dedicated service or an integrated service is provided for PRM, the level of accessibility of public transport in a particular city or region can all depend on the available budget, the size of the city, the number of people with disabilities, topography, infrastructure and available technology.

In order that people with disabilities are able to participate fully in society it must be made possible for them to fully use public transport by making it more accessible. While special dedicated services are often the only feasible option for people with severe disabilities, the inflexibility of such systems prevent spontaneity and exclude many people with disabilities from leading fully integrated lives. Running a separate dedicated system also involves huge costs, money which could be reallocated to help make public transport more accessible.
While the study showed that much progress has been made in improving accessibility of public transport, it has also found that this progress is very uneven across the 15 Member States. Some countries have made significant progress in certain areas, but less so in others. Much progress has been made in vehicle technology. As the life span of trams is relatively long, the conversion of fleets from high-floor to low-floor vehicles has been much slower than for buses. Further developments include ramps, lifts and kneeling systems. Colour contrasting, visual and audible information systems for people with sensory impairments have also improved accessibility and many underground stations have been equipped with lifts and ramps. This has been fairly easy for newer systems, but often enormous technical problems and financial costs are involved in adapting older infrastructures to the needs of people with disabilities.

Significant improvements have been made over the last ten years, but it must be remembered that in order to allow a sufficient impact to be made, it is necessary to approach accessibility from different angles simultaneously. Therefore, the operation of state-of-the-art vehicles will have little effect on improving accessibility if elderly passengers and passengers with disabilities have difficulties getting to stops and stations because accompanying measures such as lifts or ramps have not been implemented, or high kerbs, uneven pavements and illegally parked cars create difficulties for wheelchair users to reach stops and stations.

Moreover, it is important that ministries, transport operators, municipal authorities, vehicle manufacturers as well as the elderly, people with disabilities and any other players involved, work together on achieving a common goal of improved accessibility. Impressive legislation and regulations should not remain beautiful solutions on paper, but should be enforced and practised. Also, by including elderly and disabled people or their representatives in urban development plans, local authorities do not only benefit from such first-hand experience, but can also be advised by these groups on how and where it is necessary to invest to improve accessibility.

Finally, it is also important to stress that the creation of a fully accessible public transport system benefits not only PRM, but also all citizens in the EU. The introduction of technology such as low-floor vehicles involves only minimal costs and is not only more comfortable for all passengers alike, but also speeds up boarding and alighting. This reduces energy costs and pollution due to emissions and makes public transport more attractive, thus encouraging more people to leave their cars at home. This in turn means less congestion in inner cities, leading to a cleaner and healthier environment.

It is hoped that the observations and recommendations contained in this report will be able to contribute towards making public transport more accessible. The declining birth rate and the ever increasing number of elderly people make the need for the provision of an accessible public transport system all the more urgent.
1 Introduction

Mobility is an essential component of modern society. All citizens should be able to participate in economic, social and cultural life. Countries, states, cities and communities provide different forms of service. Public transport systems, consisting mainly of buses, trams, underground systems, and suburban rail and ferries, should be accessible to all. These systems provide a service for everyone and not only those people in urban conurbations but also to some extent those in rural areas.

Despite this fact, however, a relatively large number of citizens have difficulties using these modes of transport and are thus inevitably excluded from unrestricted mobility. These are people who, due to their disabilities, are not able to make the necessary or desired trips with public transport at all, with great difficulty or only with help from others. This not only includes disabled people who have been officially recognised as being disabled (e.g. reduction in the capacity to work), but also includes those people who have difficulties walking, standing, seeing, hearing, gripping or understanding. It does not only include people with disabilities in the narrow sense, but also, for example, elderly and frail people, who make up the biggest proportion of people with disabilities. Even basic activities, such as shopping, medical appointments or trips to authorities, not to mention participation in all social activities, are not possible for these people or only possible with great difficulty. These citizens also have a right to measures which facilitate their independence or mobility to the greatest possible extent.

An important task for society is to integrate PRM in all spheres of life. For this reason numerous associations and initiative groups have, over the last decades, been increasingly calling for the design of a barrier-free environment. Furthermore, there is an increased need for a wider scope of action for many people with disabilities. On the one hand, the availability of appropriate public transport services reduces the dependency of this group on others (helpers and care providers), and on the other hand, allows current costs to be saved in the long and medium term which at present are used to provide separate dedicated transport services for PRM. Many cities and transport operators responded to these demands many years ago and introduced appropriate measures. However, PRM integration into public transport has more to it than just the technical issues. Other essential points are the regulatory and financial conditions which facilitate such integration in the first place.

The freedom of movement for all citizens should be guaranteed for all areas of transport. This applies to the freedom in choosing the transport mode as well as to mobility on routes between home and the mode of transport, and between the transport mode and the destination point. The State reserves the right to approve the setup and operation of public transport. Meeting safety demands for all passengers also plays an important role. There is also potential for conflict with other passengers when conveying people with reduced mobility, for example, during boarding and alighting, sudden braking or operational breakdowns (alighting on an open stretch). Such circumstances should not create problems for PRM in using public transport or in their ability to use public transport.

Unfortunately, there is no binding definition for the group “PRM”, neither throughout the European Union nor in the individual EU Member States. Consequently, there is hardly any documentation to accurately estimate the number of PRM. Even where exact figures are available, it is important to differentiate between possible measures, because the feasibility of integrating the different groups in question has to be considered. Every mobility impairment is different and requires specific countermeasures. In most cases, this includes a reduction of the demands made on the transport system by its passengers. Thus, the aim must be to design public transport systems and vehicles with the needs of people with disabilities in mind, whereby, all or as many mobility disabilities as possible, are taken into consideration.
It is important to remember that reaching a destination requires the entire transport chain to be adapted to the needs of PRM\textsuperscript{1}. In addition to a disabled person being able to leave his place of residence without any assistance, this also means the provision of an obstacle-free route to the stop or station, appropriately equipped stops, stations, adapted vehicles and all public spaces which could potentially be a journey destination. Individual physical measures such as the barrier-free design of a stopping point or vehicle are not always effective. With some technical flair and good organisation a lot can be achieved for PRM without incurring considerable costs. It has been widely accepted that a barrier-free environment should be introduced step-by-step, as technical and financial constraints do not allow for quick, complete solutions.

Some progress has been made over the last 20 years towards integrating people with disabilities in the transport sector. An important aim of society must, however, be the complete integration of PRM in all different spheres of life. People with disabilities wish to reduce the degree of their dependence as much as possible. This in turn leads to economic and social benefits for society as a whole. For this reason, transport policy measures should be directed towards equally satisfying the wishes of both able-bodied and disabled people. A number of ideas and approaches by European cities have been highlighted within the frame of this study.

\textsuperscript{1} European Conference of Ministries of Transport (1991): Transport for People with Mobility Handicaps: Policy and Achievements in Europe
2 The Situation for citizens with reduced mobility in the EU Member States

2.1 People with reduced mobility

This study focuses on the transport problems encountered by people with reduced mobility (PRM). At first glance it would seem that the PRM group only includes severe disabled people such as wheelchair users and visually and audibly impaired people. This however is not the case. The difficulties PRM have in using public transport can be due to the following impairments:

- Walking, negotiating steps
- Standing, sitting
- Gripping, holding
- Seeing, hearing
- Orientation and remembering.

Many PRM are dependent on assistance from others to help them leave their homes or to travel over short or long distances. The aim of society should be to enable everyone to fulfill their desire and need to physically move around without any restrictions due to physical, sensory, mental or psychological disabilities. Using transportation and travelling is an essential component. There are also many people with mobility problems who, according to official definitions, are not classified as disabled although they are subject to one of the aforementioned incapacities.

Elderly people in particular belong to this group and constitute a much bigger group than disabled people in the narrow sense. Although there is no standard age limit, in most references people aged “65 and over” are included in this group. These are people who have basic problems reaching and using local transport. To some extent, even physique has an effect on mobility. People of small stature are often not able to climb high steps (e.g. when boarding the bus) or have problems taking a seat.

An overview of the whole range of people with reduced mobility is shown in the following diagram:

Figure 1.: People with reduced mobility

- People with physical, sensory or psychological disabilities
  - Physical disability (wheelchair user, mobility impaired, difficulty standing, gripping or holding)
  - Sensory disability (blind, visually impaired, deaf, audibly impaired)
  - People with speech impairments
  - People with orientation difficulties
  - People of small stature; large people
  - People with mental or psychological disabilities

- People with age-related mobility restrictions
  - Elderly people (over 64 years)
  - Small children (under 3 years)

- People with temporary mobility restrictions
  - People experiencing temporary injuries or illnesses
  - Expectant mothers
  - Persons with buggies or heavy luggage
There are also many citizens with temporary mobility impairments. In the broad sense, the PRM group includes people with temporary illnesses, e.g. broken bones or temporary disabilities resulting from operations, people on crutches or people temporarily using a wheelchair. Moreover, small children (under the age of 3), pregnant women and people with pushchairs or heavy luggage are also often classified as PRM, as their capacity to move is restricted. Their mobility problems are similar in part to those of people with disabilities.

This group of persons requires unrestricted access to public transport as much as any other citizens. Unfortunately, however, the present level of access leaves a lot to be desired. Included in the category “PRM” are all those who, according to the demands made on them by local public transport, are disabled or feel disabled.

2.2 The number of people with reduced mobility

2.2.1 Structural data of the EU Member States

In order to provide an overview of the situation in the 15 Member States within the framework of this study, a survey of national administrations, national public transit organisations and national disabled organisations was conducted. In addition official statistics from different sources, e.g. ECMT and Eurostat, were also consulted.

Each of the EU Member States is very different in terms of surface area, structure and population. Therefore, only relative and not definitive figures with regard to structural data of the individual countries can be compared. In this case, it is therefore only possible to provide documentation of the specific situation of individual states as extracted from the responses obtained. The most important structural and socio-economic data of the 15 EU Member States will be briefly presented:

Figure 2.: Structural data of the 15 EU Member States (2000)

<table>
<thead>
<tr>
<th>EU member states</th>
<th>area (km²)</th>
<th>inhab (1000)</th>
<th>inhab/km²</th>
<th>age 65+ years (1000)</th>
<th>age 65+/inhab (%)</th>
<th>GDP 1999 (1000€)</th>
<th>GDP/inhab (1000€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>3.191.120</td>
<td>376.854</td>
<td>118</td>
<td>61.271</td>
<td>16,3%</td>
<td>8.016.482</td>
<td>21,27</td>
</tr>
<tr>
<td>Belgium</td>
<td>30.518</td>
<td>10.251</td>
<td>336</td>
<td>1.722</td>
<td>16,8%</td>
<td>235.538</td>
<td>22,98</td>
</tr>
<tr>
<td>Denmark</td>
<td>43.094</td>
<td>5.340</td>
<td>124</td>
<td>791</td>
<td>14,8%</td>
<td>162.215</td>
<td>30,56</td>
</tr>
<tr>
<td>Finland</td>
<td>304.530</td>
<td>5.176</td>
<td>17</td>
<td>772</td>
<td>14,9%</td>
<td>120.485</td>
<td>23,28</td>
</tr>
<tr>
<td>France</td>
<td>543.965</td>
<td>58.893</td>
<td>108</td>
<td>9.466</td>
<td>16,1%</td>
<td>1.350.159</td>
<td>22,93</td>
</tr>
<tr>
<td>Germany</td>
<td>357.020</td>
<td>82.100</td>
<td>230</td>
<td>13.209</td>
<td>16,1%</td>
<td>1.974.200</td>
<td>24,05</td>
</tr>
<tr>
<td>Greece</td>
<td>317.628</td>
<td>10.538</td>
<td>80</td>
<td>1.893</td>
<td>17,1%</td>
<td>117.823</td>
<td>11,18</td>
</tr>
<tr>
<td>Ireland</td>
<td>70.273</td>
<td>3.801</td>
<td>54</td>
<td>426</td>
<td>11,2%</td>
<td>89.029</td>
<td>23,42</td>
</tr>
<tr>
<td>Italy</td>
<td>301.316</td>
<td>57.762</td>
<td>192</td>
<td>10.460</td>
<td>18,1%</td>
<td>1.107.779</td>
<td>19,18</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2.586</td>
<td>438</td>
<td>169</td>
<td>63</td>
<td>14,4%</td>
<td>18.449</td>
<td>42,12</td>
</tr>
<tr>
<td>Netherlands</td>
<td>33.882</td>
<td>15.926</td>
<td>470</td>
<td>2.163</td>
<td>13,6%</td>
<td>373.664</td>
<td>23,46</td>
</tr>
<tr>
<td>Portugal</td>
<td>91.906</td>
<td>10.211</td>
<td>111</td>
<td>1.578</td>
<td>15,5%</td>
<td>108.214</td>
<td>10,60</td>
</tr>
<tr>
<td>Spain</td>
<td>504.790</td>
<td>39.927</td>
<td>79</td>
<td>6.730</td>
<td>16,9%</td>
<td>565.483</td>
<td>14,16</td>
</tr>
<tr>
<td>Sweden</td>
<td>410.934</td>
<td>8.872</td>
<td>22</td>
<td>1.532</td>
<td>17,3%</td>
<td>227.607</td>
<td>25,65</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>243.820</td>
<td>59.507</td>
<td>244</td>
<td>9.299</td>
<td>15,6%</td>
<td>1.368.181</td>
<td>22,99</td>
</tr>
</tbody>
</table>

Source: Eurostat Datenbank NewCronos

In the year 2000, almost 376.9 million inhabitants lived in the European Union (EU). Approximately 61.3 million (16.3 %) of these inhabitants are 65 or over\(^2\). This percentage varies considerably in the individual states; in Ireland the figure is by far the lowest with 11.2 %, while in Italy it is highest with 18.1 %. There are also great differences across the EU in Gross Domestic Product (GDP), which at least gives an insight into the financial possibilities of the individual states. The GDP varied considerably between 10,600 and 42,100 €/inhabitant.

\(^2\) Eurostat Databank NewCronos
2.2.2 The number of people with disabilities

For individual Member States there are also figures for the percentage of the population which is severely and moderately disabled. This provides a figure of approximately 11.7 million severely disabled people and a further 25.6 million people with moderate disabilities in the 15 EU Member States, and so in total there are approximately 37.3 million disabled people in the EU, which corresponds to a percentage of 14.6% of 16 – 64 year-olds.

Here there are also big differences in the individual EU Member States. In Finland approximately 22.9% of the 16-64 age group is severely or moderately disabled, while in Italy – the country with the highest proportion of elderly people in the EU – the corresponding percentage of disabled people is lowest with 7.8%. This total number of people with disabilities represents only one component of the PRM group.

Figure 3.: Inhabitants, disabled people and PRM in the EU (2000)

<table>
<thead>
<tr>
<th>EU member states</th>
<th>inh tab total age 16-64 (1000)</th>
<th>inh tab reporting severe disability* (%)</th>
<th>inh tab reporting severe disability (1000)</th>
<th>inh tab reporting moderate disability* (%)</th>
<th>inh tab reporting moderate disability (1000)</th>
<th>age 65 years and more (1000)</th>
<th>PRM total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>5.680</td>
<td>3.2%</td>
<td>179</td>
<td>9.3%</td>
<td>500</td>
<td>1.257</td>
<td>1.956</td>
</tr>
<tr>
<td>Belgium</td>
<td>6.846</td>
<td>4.6%</td>
<td>315</td>
<td>8.3%</td>
<td>568</td>
<td>1.722</td>
<td>2.605</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.621</td>
<td>4.7%</td>
<td>170</td>
<td>12.7%</td>
<td>460</td>
<td>791</td>
<td>1.421</td>
</tr>
<tr>
<td>Finland</td>
<td>3.528</td>
<td>5.3%</td>
<td>219</td>
<td>16.7%</td>
<td>589</td>
<td>772</td>
<td>1.580</td>
</tr>
<tr>
<td>France</td>
<td>39.106</td>
<td>4.0%</td>
<td>2.546</td>
<td>9.3%</td>
<td>3.637</td>
<td>9.466</td>
<td>15.449</td>
</tr>
<tr>
<td>Germany</td>
<td>56.896</td>
<td>4.6%</td>
<td>2.617</td>
<td>12.7%</td>
<td>7.225</td>
<td>13.209</td>
<td>23.050</td>
</tr>
<tr>
<td>Greece</td>
<td>7.241</td>
<td>3.3%</td>
<td>239</td>
<td>4.9%</td>
<td>355</td>
<td>1.803</td>
<td>2.397</td>
</tr>
<tr>
<td>Ireland</td>
<td>2.610</td>
<td>2.5%</td>
<td>65</td>
<td>8.4%</td>
<td>219</td>
<td>426</td>
<td>710</td>
</tr>
<tr>
<td>Italy</td>
<td>39.552</td>
<td>2.3%</td>
<td>910</td>
<td>5.5%</td>
<td>2.175</td>
<td>10.460</td>
<td>13.545</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1.095</td>
<td>4.3%</td>
<td>13</td>
<td>12.1%</td>
<td>36</td>
<td>83</td>
<td>112</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10.995</td>
<td>5.8%</td>
<td>638</td>
<td>12.7%</td>
<td>1.396</td>
<td>2.163</td>
<td>4.197</td>
</tr>
<tr>
<td>Portugal</td>
<td>7.048</td>
<td>7.5%</td>
<td>529</td>
<td>10.9%</td>
<td>768</td>
<td>1.578</td>
<td>2.875</td>
</tr>
<tr>
<td>Spain</td>
<td>27.720</td>
<td>3.3%</td>
<td>915</td>
<td>6.6%</td>
<td>1.830</td>
<td>6.730</td>
<td>9.474</td>
</tr>
<tr>
<td>Sweden</td>
<td>5.820</td>
<td>4.8%</td>
<td>279</td>
<td>9.9%</td>
<td>576</td>
<td>1.532</td>
<td>2.388</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>39.609</td>
<td>5.7%</td>
<td>2.258</td>
<td>13.2%</td>
<td>5.228</td>
<td>9.299</td>
<td>16.785</td>
</tr>
</tbody>
</table>

* age group 16-64, 1996
Source: Eurostat Databank NewCronos, BVG Questionnaire (Sweden)

Information on the proportion of different types of disabilities was also requested in the surveys. The country data, for which appropriate values are available, sometimes deviate substantially from each other. On average, 35% have walking disabilities, followed by 16% with audible impairments and 12% with visual impairments. The remaining 37% have other impairments.

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2 Eurostat Databank NewCronos; Sweden: BVG Questionnaire for National Administrations
3 BVG Questionnaire for National Administrations
2.2.3 The total number of people with reduced mobility

As already mentioned above, the group of People with Reduced Mobility mainly consists of people with disabilities and people with age-related mobility restrictions. The latter make up a greater number: so in determining the total number of PRM the 61.3 million citizens aged 65 and over are added to the 37.3 million disabled people.

Taking the figures for disabled and elderly persons into consideration in this study this assumption can be made for the following target group:

The number of PRM in the 15 EU Member States amounts to approximately 99 million people, which represents 26 % of the total EU population.\(^5\)

This percentage varies in the individual EU Member States between 18.7 % (Ireland) and 30.5 % (Finland).

2.2.4 Future development in the number of PRM

A look at forecasts for the development of these figures shows that the subdivision of the population with reduced mobility is increasing. In particular, the number of people aged 65 and over is steadily rising. And it must be assumed that the number of PRM in many of the Member States of the Union will develop in the same way and will continue to rise in the future. The proportion of inhabitants aged over 64 in the Member States has increased in the last ten years from 14.6 % to 16.3 % and this tendency is continuing to rise. Due to the rising population figures the total number of over-64-year-olds in the EU Member States increased during the same period by 14.9 %.\(^6\).

For the year 2010, it is expected that there will be 70.6 million people aged 65 and over in the EU, which is an increase of 15.2 % compared to 2000 and an increase of

\(^5\) Eurostat Databank NewCronos; BVG Questionnaire for National Administrations. This estimate refers to the situation in 2000 and does not include people with temporary mobility restrictions or small children.

\(^6\) Eurostat Databank NewCronos
Figure 5.: Development of the proportion of EU inhabitants aged 65 and over

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage of population aged 65 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>14.6%</td>
</tr>
<tr>
<td>1995</td>
<td>15.5%</td>
</tr>
<tr>
<td>2000</td>
<td>16.3%</td>
</tr>
<tr>
<td>2005</td>
<td>17.2%</td>
</tr>
<tr>
<td>2010</td>
<td>18.1%</td>
</tr>
</tbody>
</table>

Source: Eurostat

32.4 % compared to 1990\(^7\). This means that more and more people are reaching an age in which problems with physical movement and, consequently, mobility are commonplace. This increase in the proportion of elderly citizens is due not only to the declining birth rate in many industrial nations, but also due to higher life expectancy.

Figure 6.: Development of people with disabilities and people aged 65 and over

<table>
<thead>
<tr>
<th>Year</th>
<th>Mio people</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>37.3</td>
</tr>
<tr>
<td>2010</td>
<td>70.6</td>
</tr>
</tbody>
</table>

Source: Eurostat

---

\(^7\) Eurostat Databank NewCronos
If the number of disabled people develops accordingly, in 2010 there will be 42.9 million people with disabilities in the EU Member States. Therefore, the total number of PRM will increase to over 113 million by 2010. Exact forecasts for the development of figures for disabled people are unfortunately so far not available, but this estimate reflects the expected tendency over the next 10 years. It is certain that the group of people who benefit from measures to improve mobility will continue to grow from year to year.

2.3 Transport services for PRM

2.3.1 Public transport

The difficulties faced by PRM in using public transport have been assessed within the framework of this study. As opposed to private transport, "local public transport" refers to all transport modes which provide an accessible conveyance of people and allow them to move around within a radius of approximately 50 km. This study has concentrated on the following urban public transport modes:

- Buses
- Trams and streetcars
- Suburban trains and underground networks
- Ferries

However, as will be mentioned in more detail later, the degree and extent to which these transport modes have been adapted to the needs and demands of PRM vary greatly. The difficulties encountered when using public transport mainly result from the fact that the conception, design and operation of transport modes are based only on the needs of more mobile users. Thus, PRM often have great problems even reaching the relevant vehicles because, for example, the platforms from which the vehicles must be boarded can often only be accessed via stairs or escalators. Lifts, or at least ramps with a gradient that allows wheelchair users to use them without assistance are lacking, in particular in older buildings, as they were not included in the constructional design.

Boarding and alighting from vehicles, e.g. buses and trains, creates great problems for PRM. The main hindrances are steps or too narrow entrances/exits. Steps are found depending on the vehicle model, e.g. in buses with an engine under the floor, and also in many rail systems there are relatively big differences in height between the platform and the floor of the vehicle. All these problems however can be solved technically, for example, by introducing rear engines in buses or automatic level regulation in rail systems.

2.3.2 Special dedicated services

A few years ago special dedicated services for disabled people were considered the most practical (and supposedly cheapest) alternative to a barrier-free local public transport service in many cities. These services are usually based on the dial-a-ride bus system, where journeys can be booked in advance via a central control unit. The people eligible to use these services are usually those who cannot use local public transport (not adapted to the needs of disabled people) or can only use it with great difficulties. The criteria for this eligibility and the permitted journey purpose (e.g. journeys to work or educational institute, for medical treatment, personal errands or for leisure activities) are handled differently from city to city. The eligible disabled persons are picked up with special minibuses or taxis from their front door or even from directly inside their home and taken to their destination. In order to increase as much as possible the full capacity use of the vehicles deployed, several journey requests overlapping in time and direction are bundled together.

More than half (53 %) of the cities use minibuses for their special dedicated services, a further 12 % of the cities use taxis for this purpose. 12 % also provide this service
using a combination of minibuses and taxis. The remaining 23% of the cities, i.e. almost a quarter of all respondent cities, provide no special dedicated services at all.\textsuperscript{8}

**Figure 7.** Special dedicated services in the cities

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using taxis</td>
<td>12%</td>
</tr>
<tr>
<td>No service</td>
<td>23%</td>
</tr>
<tr>
<td>Using both</td>
<td>12%</td>
</tr>
<tr>
<td>Using minibuses</td>
<td>53%</td>
</tr>
</tbody>
</table>

Source: survey

These special dedicated services for people with disabilities cannot meet the demands for unrestricted mobility because they are mostly only available through advanced booking, sometimes several days in advance, and so stand in the way of spontaneous participation in society. Furthermore, these dedicated services often have an allocated number of journeys and do not guarantee full mobility. These services are usually cost intensive due to the fact that a relatively small number of journeys have to be organised in many different directions. Reducing costs by increasing vehicle capacity is therefore not possible. What is more, special dedicated services mean exclusion for this group of people as they do not travel with local public transport passengers, but instead with other persons with disabilities.

For these reasons, special dedicated services can only be an alternative for those people who, due to a severe disability, are not in the position to use a barrier-free local public transport system and for people who, for example, have to be collected directly from their homes as they are confronted with several obstacles (e.g. no lift for wheelchair users). In all other cases – and that applies to the majority of PRM – public transport is a much better alternative as it can be used spontaneously, does not isolate passengers (in special vehicles) and each journey can be made more cheaply than those made using a special dedicated service.

Thus, special dedicated bus services are not the preferred means, even though they are often the only possibility open to people with disabilities.

### 2.3.3 Taxis

Taxis constitute an important proportion of transportation in cities and also offer a door-to-door service, without advance booking and around the clock. They could

\textsuperscript{8} BVG Questionnaire for Municipal Transport Administrations and Municipal Disabled Associations. The survey is described in section 3.1 and Annex IV.
serve as a connecting link between a public transport system that is adapted to the needs of people with disabilities (without advance booking, but no door-to-door service) and a special dedicated bus service for disabled people (with door-to-door service, but with advanced booking).

There are approximately 450,000 taxis in the 15 EU Member States. However, most of the taxis are only suitable for a relatively small group of people with severe disabilities if special vehicles are not used. Only folding wheelchairs can be transported by normal taxis, thus excluding electric or hand lever operated wheelchairs. Disabled people who have problems with their joints are generally unable to lower themselves into taxi or car seats. The vehicle industry does offer some technical solutions for fully accessible taxis (e.g. “London cab”) which can also be used by wheelchair users without any problems.

Unfortunately only very few countries have exact figures for the number of taxis adapted to the needs of PRM. Only Finland and Ireland have the relevant data, however, no conclusion can be drawn from this information for other states or for the EU as a whole. So, for example, in the United Kingdom a very large number of taxis are accessible (for example all of London’s 20,000 taxis plus those in other major cities and towns). However, it is very difficult to force improvements for people with disabilities as the taxi business is privately organised and subject to strong competition.

Therefore, travelling by taxi excludes more people with severe disabilities than a good public transport system, i.e. one which is adapted to the needs of people with disabilities. But the accessibility is not the only disadvantage of taxis. Travel by taxi is a very cost intensive alternative for people with disabilities if there are no public subsidies available. Yet in many cities the use of taxis is the only option open to disabled people as there is (still) no other alternative form of local public transport which is adapted to the needs of people with disabilities.

### 2.3.4 Private cars

The number of private passenger cars (incl. taxis) in the EU is approximately 177.4 million. This also includes a number of adapted passenger cars. The ownership of a specially adapted private car is, for some people with disabilities, an alternative to (not fully adapted) local public transport systems. In some states legal provisions even support the purchase of such vehicles, operation costs or priority parking (cf. chapter 5.2.6). These measures can only be recommended as a temporary solution until the local public transport system in the respective city or region has been sufficiently adapted. As this is ultimately financed in most cases with public money, additional financial support for individual transportation for people with disabilities cannot be justified.

The EU is currently conducting a study within the framework of which the number of adapted passenger cars will be established. So far only four states have been able to provide figures for such vehicles (Finland, Ireland, Sweden, United Kingdom). According to the figures available the percentage of passenger cars adapted to the needs of people with disabilities is between 0.1 % and 1.0 % of the total number of passenger cars. The problem in recording information about such vehicles lies in the fact that often automatic transmission facilitates the driving of vehicles by disabled people and only few cars have special adaptations such as swivel seats, hoists etc. Another possibility would be to register the number of cars with a reduction in taxes due to the owner’s or a family member’s disability; however, this does not allow any conclusions to be drawn about adaptations for disabled people.

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9 ECMT(2001), Economic Aspects of Taxi Accessibility
10 DG Energy and Transport: Energy and Transport in Figures
11 On-going Quavadis project, DG TREN.E.3.
12 National statistics
The Mobility of PRM in Local Public Transport

The number of trips made by PRM by public transport in the EU States was requested during this study on two separate occasions within a period of one year. On both occasions most states replied saying that such statistics are not collected. Therefore, no exact figures can be provided. In some countries there are only figures available for the number of journeys made by taxi or by special transport services, in those cases where the state subsidies for fare reductions are taken advantage of. Other countries only have figures for the number of journeys made by people aged 65 and over. In both cases this is nowhere near the total number of journeys made by PRM in public transit.

Only Sweden and Germany submitted data concerning the proportion of public transportation usage by mobility impaired. In both countries, about 42% of those persons can travel without particular difficulties. In Sweden, the amount of PRM excluded from public transportation (31%) is higher than in Germany (20%). However, the proportion of journeys made by disabled people compared to all journeys made by public transport is definitely higher in Sweden with approximately 11%, compared to only 6% in Germany\textsuperscript{13}.

Such figures can only provide a very rough idea about the use of local public transport by PRM. In reality, these figures can only be determined with some difficulty as the number of journeys made by PRM who require assistance and which are registered by drivers or data collectors is rarely collected. This is in part due to the increased number of vehicles and stops adapted to the needs of disabled people who can travel without special assistance from drivers.

\textsuperscript{13} BVG Questionnaire for National Transport Organisations and National Disabled Organisations
3 Estimates and measures in the selected cities

3.1 Survey of selected cities

The survey approach adopted in this study was based as far as possible on practical experiences from as many different EU cities as possible. The necessary information from the municipal authorities, transport operators and disabled organisations was collected by means of written surveys. In order, on the one hand, to obtain a representative selection of cities, but on the other hand to limit the total number of cities, it was decided to first compile and then agree on a list of criteria to be used in the selection.

The 15 Member States were divided according to population size into small countries (less than 5m inhabitants), medium sized countries (5 – 25m inhabitants) and big countries (more than 25m inhabitants). For small countries, 2-3 cities were selected, for medium sized countries 4 cities and for big countries 8 cities. The capital city was selected in all cases. Out of the 77 cities which were approached during this study, and despite numerous reminders, only 32 cities could provide information about the services they offered for people with disabilities and their use. Therefore, useful comparisons and conclusions have only been possible to a limited extent. The response rate to the surveys was 31 % for municipal transport administrations (24 questionnaires), 33 % for urban transport operators (33 questionnaires) and 14 % for municipal disabled associations (11 questionnaires).

3.2 PRM in the cities

The responses from the three target groups, municipal authorities, transport operators and disabled associations provide a comprehensive overview of the situation for PRM and the transport services provided by operators in various cities in the EU. The first question asked of all target groups was the number of PRM. The proportion of people in this group was estimated at between 3.1 % and 30.8 %. The values fluctuate greatly. One of the reasons for this is the fact that the term “mobility impaired” was interpreted differently, often due to different views on the perceived severity of the disability. It is clear that the numbers of PRM in many cities are often underestimated. The average of the figures provided is approximately 12.7 %, which is appears rather low given that the estimate if the proportion of PRM in the whole EU is approximately 26 % (cf. chapter 2.2.3). Further awareness-raising amongst local authorities responsible for public transport may be necessary with regard to the numbers and difficulties of PRM.

A further question about the percentage of elderly and disabled passengers was posed. As already established in other studies, the average number of specific journeys made by disabled people is lower than those made by the rest of the population and so the figure here should be lower than the figure for the proportion of the population which is mobility impaired. The average rate of mobility impaired passengers provided by the cities was 16 %.

3.2.1 Approach of cities to making public transport accessible

With these figures in mind, the cities were asked what actions were taken to ensure the transportation of PRM. Most of the respondent cities today (80.6 %) follow a combined approach of an accessible public transport system along with the operation of a separate, dedicated service for disabled people. A further 19.4 % of the cities stated that their actions are focussed on promoting a fully accessible public transport system.
transport system for persons with disabilities\textsuperscript{17}. Not one city was in favour of the operation of a separate, dedicated service. The strategy of the cities today is a clear move away from the old philosophies of an exclusively dedicated transport service for people with disabilities. Developing local public transport for PRM is a priority in all cities, either on its own or in conjunction with a special dedicated service. The advantages of such an integration of disabled people into the public transport system have already been mentioned in a previous section (cf. chapter 2.2).

### 3.2.2 Obstacles to accessibility

With regard to a barrier-free design of local public transport, the questionnaires also asked what were considered to be the biggest obstacles for persons with disabilities. The spectrum of answers is very wide, ranging from difficulties getting to and from stops and stations, to illegal parking and height differences when boarding and alighting, and a lack of information systems for disabled people\textsuperscript{18}. A list of obstacles is contained in the following table.

Figure 9.: Survey responses on the major obstacles for persons with disabilities

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Percentage of questionnaires (more than one answer possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boarding height too high</td>
<td>19%</td>
</tr>
<tr>
<td>Stops/stations are not adapted to the needs of people with disabilities (e.g. steps)</td>
<td>14%</td>
</tr>
<tr>
<td>Stops and stations are difficult to get to (kerbs, pedestrian tunnels)</td>
<td>10%</td>
</tr>
<tr>
<td>Illegally parked vehicles prevent the bus from driving up to the kerb</td>
<td>10%</td>
</tr>
<tr>
<td>No accessibility or poor accessibility of local public transport for wheelchair users and blind people</td>
<td>8%</td>
</tr>
<tr>
<td>Lack of guiding and orientation systems for people with disabilities</td>
<td>8%</td>
</tr>
<tr>
<td>Lack of information about transport services adapted to the needs of people with disabilities</td>
<td>7%</td>
</tr>
<tr>
<td>Height difference and gaps in the rail system</td>
<td>5%</td>
</tr>
<tr>
<td>Absence of lifts and escalators</td>
<td>3%</td>
</tr>
<tr>
<td>Vehicle design (steps inside)</td>
<td>3%</td>
</tr>
<tr>
<td>Advertising hoardings and road signs on pavements</td>
<td>3%</td>
</tr>
<tr>
<td>Structural and architectural barriers</td>
<td>3%</td>
</tr>
<tr>
<td>Absence of required escort</td>
<td>2%</td>
</tr>
<tr>
<td>Automatic door opening system</td>
<td>2%</td>
</tr>
<tr>
<td>Vehicles are too crowded to transport people with disabilities</td>
<td>2%</td>
</tr>
</tbody>
</table>

\textsuperscript{17} BVG questionnaire to Urban Transport Operators, Municipal Transport Administrations and Municipal Disabled Organisations

\textsuperscript{18} BVG questionnaire to Urban Transport Operators and Municipal Disabled Organisations
The obstacles mentioned should be taken into consideration when developing a local public transport which is adapted to the needs of disabled people. Thus, the recommendations for solutions which have been collected and explained below refer directly to these obstacles. The first five obstacles refer to the problem area of “Step-free (and gap-free) accessibility to stations, stops and vehicles”. Information systems for disabled people continue to play an important role. Interestingly enough, it is almost exclusively technical problems which hinder the use of local public transport by PRM; only 2 % of respondents refer to the lack of help from other persons.

The general opinion seems to be that the development of a barrier-free local public transport system is both worthwhile and attractive. According to almost 90 % of municipal disabled associations, changes in public transportation have a definite influence on the use of the system. Furthermore, a barrier-free design also enables the remaining passengers to benefit from the added comfort and convenience.

3.2.3 Use of different transport means

According to information from disabled associations the transport mode used most frequently by PRM is at present buses (67 % regular use), taxis (70 % regular use) or a special dedicated service (56 % regular use). This is of course due to the services available to PRM in the individual cities. The (relatively expensive) taxi service heads the list of modes of transport, which indicates that a barrier-free local public transport system still has a long way to go. Of all the public transport modes, the bus is used most frequently. This is due to the fact that this transport mode (compared with the underground system or the suburban train) is offered in all cities, but also because the conversion in the bus sector to the use of low-floor vehicles which are adapted to the needs of disabled people, has made the most progress. This will be dealt with in more detail later on.

Figure 10.: Usage of different means of transportation by PRM

![Diagram showing the usage of different means of transportation by PRM]

Source: survey

Apart from estimating the current use of transport modes by people with disabilities, the surveys also asked which form would be preferred by this group if the transport modes were fully adapted to the needs of people with disabilities. The accuracy of

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19 BVG Questionnaire for Municipal Disabled Organisations
20 BVG Questionnaire for Municipal Disabled Organisations
the bus fleet conversion process to vehicles adapted to the needs of people with disabilities, which is presently occurring in all transport companies, has thus been confirmed by the estimation of municipal disabled associations which shows that most disabled people would prefer the bus as an unrestricted mode of transport. The rail systems (tram and underground) are not frequently used, probably because the barriers to accessibility are greatest here\(^{21}\).

![Figure 11.: Preference of different means of accessible transportation by PRM](image)

### 3.3 Buses

Step-free boarding on buses is of course the biggest demand. This demand can easily be met by operating low-floor buses, which have a boarding height of approximately 32 cm. These vehicles not only improve passenger turnover, speed up boarding and alighting and lead to shorter turnaround times, but also lower operational costs and have fewer emissions.

#### 3.3.1 Low-floor technology

The most progress has been achieved by transport operators in the area of barrier-free design of bus transportation which is due to developments in recent years in low-floor technology. While in 1990 an average of only 12 % of the buses were low-floor, in 1995 this figure had risen to 31 %. In the year 2000, 55 %, or more than half of all buses used, were low-floor\(^{22}\). If this development is extrapolated, it can be assumed that in approximately 12 years all city buses will be accessible for wheelchair users and people with walking disabilities. This development can be expected because according to information from the vehicle manufacturing industry, at present approx. 98 % of all new city buses sold are low-floor buses\(^{23}\). With an average bus life-span of 12-20 years, an end is in sight for the use of high-floor city buses with boarding steps.

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\(^{21}\) BVG Questionnaire for Municipal Disabled Organisations

\(^{22}\) BVG Questionnaire for Urban Transport Operators

\(^{23}\) BVG Questionnaire for Bus manufacturers
The interesting thing about the existing low-floor vehicles is the boarding height at the doors. The lower the level, the easier it is for wheelchair users and people with walking disabilities to board and alight, even where the kerb height plays a role. Most cities quoted boarding height levels of 30 – 35 cm. By letting air out of the air cushion springs at bus stops, the boarding height in buses with a kneeling system can be reduced even more, to 20 – 25 cm. If not only the applied technology but also a kerb height of approximately 12 – 15 cm is taken into account, then the height difference when boarding can be reduced by about 5 – 10 cm. Nearly all new buses manufactured have the kneeling system. Some companies still include mechanical ramps or jack-lifts in buses to enable completely level boarding and alighting for wheelchair users\textsuperscript{24}.

3.3.2 Raised bus stop platforms and kneeling

Raising the level of bus stop platforms enables almost step-free boarding onto low-floor vehicles even without the kneeling system. For this reason, information about the proportion of bus stops with an elevated platform was also requested. The results obtained show that most transport companies favoured the kneeling system as opposed to raising platforms at bus stops.

Both strategies of course have different conditions. Kneeling requires investment in the technology of each bus (procurement and operation/maintenance). According to vehicle manufacturers the extra costs for such technology account for approximately 1 – 2 % of the vehicle price\textsuperscript{25}. Raising bus stops means that extra space must be available (e.g. for ramps) and it is necessary to invest large sums in construction measures (e.g. to adjust drainage of the pavement). Both strategies fulfil the EU Directive (2001/85/EC) concerning bus design and accessibility of transit buses for PRM. This can either be achieved by means of technical adaptations to the vehicle or a combination of such measures with an appropriate design of the local infrastructure, which facilitates boarding for wheelchair users.

\textsuperscript{24} BVG Questionnaire for Bus manufacturers
\textsuperscript{25} BVG Questionnaire for Bus manufacturers
3.3.3 Wheelchair users

A further interesting question concerns the optimal entrance door for wheelchair users. Either the front or the middle door can be used and both options have their advantages and disadvantages. When using the middle door the wheelchair user is able to reach the space assigned to wheelchair users much more easily, but it is more difficult for the driver to observe the process. If the wheelchair user boards at the front, the driver can provide quick assistance if required, but the aisle has to be wider and seating space is lost in this area as a result. In this case, most transport operators preferred the middle door (90.5 %), and only 9.5 % chose the front door as the best option. In the case of two other operators all buses have only one door at the front.

The transport operators also use different solutions for the restraint system for wheelchair users in buses. Only half of all bus operators (52 %) provide for an appropriate anchorage system. The most common is the safety belt, which 40 % of operators use. This solution is very disputed because if the wheelchair and user are strapped in with the same belt, in the event of a crash there is a risk that the wheelchair user is squashed between the belt and the wheelchair. A better solution is for the wheelchair to be anchored with a belt in the bus and the user to be strapped with a separate belt to the wheelchair.

A further 12 % of operators said the wheelchair user is positioned with his back against a fixed structure which would protect him in the event of a crash, or at least in a frontal crash. This, however, is not an optimal solution because there is no protection in the case of a crash from the rear or from the side. It is surprising that 48 % of bus operators do not use any safety and tie-down-systems for wheelchair users. This shows that there is still a lot of catching up to do in the area of safety. It is important to point out that such systems do not only protect the wheelchair user, but also all other passengers who are protected if the impact of a crash leads to the wheelchair being hurled through the interior. With this in mind, tie-down systems for wheelchair users are an essential feature in buses.

Figure 13.: Safety and tie-down systems for wheelchairs in buses

3.3.4 Measures for audibly and visually impaired passengers

On the other hand, efforts are not so advanced in equipping buses for other groups of people with disabilities. On average, only approximately 45 % of buses are presently equipped to meet the needs of people with visual impairments and only 29 % of

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buses meet the needs of people with hearing impairments. 38% of the transport operators surveyed said that their buses were 100% adapted to the needs of visually impaired passengers, and just as many operators have not adapted their buses accordingly. The status regarding aids for audibly impaired people is similar. A not inconsiderable number of transport operators did not take into account the needs of visually and audibly impaired passengers when procuring new vehicles.

There seems to be more catching up to do in this area than even in step-free boarding. However, a complete implementation of the demands and needs of all groups of persons with disabilities in the bus sector can be realised, because the necessary technology is available from the vehicle manufacturing industry.

### 3.3.5 Bus deployment strategies

Responses from the transport operators to the development and number of buses in their fleets meeting the needs of disabled people showed that in most cities there is presently a mixed fleet of low-floor and high-floor buses. It is interesting to see in such mixed fleets how the buses adapted to the needs of PRM are incorporated into the service.

There is the possibility to operate accessible buses fully only on certain bus routes e.g. the most important ones or the ones with the most disabled passengers, so that each bus on that line is accessible. This means of course that the whole city does not have a service meeting the needs of people with disabilities, but it does however mean that on selected routes the waiting times for disabled people are not any longer than for able-bodied people as they can travel with every bus. The other possibility is to operate buses which meet the needs of disabled people on all routes, but mixed with buses which are not adapted to the needs of disabled people. This means that buses meeting the needs of disabled people operate throughout the whole city, but there are longer waiting times for people with disabilities as they have to wait for an appropriate bus to arrive.

The deployment concept for the currently mixed bus fleets (high and low-floor buses) is also not uniform. Approximately half of the cities (43%) run buses which are accessible to people with disabilities completely on selected bus routes, the other half

![Figure 14: Use of buses accessible to disabled persons](image)

Source: survey

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(57 %) favours a concept of mixed vehicle deployment in order that some journeys on each bus route are accessible to people with disabilities. However, both situations are only transitional because in the next few years it is anticipated that all bus fleets will be completely low-floor.

3.3.6 Improvement of bus stops

One element of city bus transport which should not be underestimated with regard to barrier-free design, is the bus stop. Here, there is also a wide palette of technical possibilities which have already been implemented by many transport operators. On top of the list is the widening of pavements, which 71 % of the transport administrations have already implemented28. It refers in this case to the widening of the pavement at bus stops in order that the kerb stretches out beyond the cars parked in front of and behind the bus stop and so the bus can drive directly up to the kerb. In this way, the gap between the kerb and the bus is reduced because the bus can drive right up to the kerb and does not have to drive around parked cars.

Further elements of bus stops which have been adapted to the needs of people with disabilities include good lighting at night, which is already practised by about 59 % of operators, and safety barriers on the edge of pavements to better protect passengers from passing traffic (35 % of transport operators). Another measure is the better control of car parking so that buses can easily drive up to the edge of the kerb29.

Figure 15.: Improvements to make bus stops more accessible

<table>
<thead>
<tr>
<th></th>
<th>Frequency of improvements to bus stops*</th>
</tr>
</thead>
<tbody>
<tr>
<td>widening of pavements</td>
<td>71%</td>
</tr>
<tr>
<td>lights at night</td>
<td>59%</td>
</tr>
<tr>
<td>safety barriers on the edge of pavements</td>
<td>35%</td>
</tr>
<tr>
<td>better control of car parking</td>
<td>35%</td>
</tr>
</tbody>
</table>

*: more than one answer possible

Source: survey

With respect to the city bus sector it is recommended to provide standard guidelines for adapting city bus systems to the needs of people with disabilities. These should not just be related to vehicles themselves (boarding height and boarding aids, door and aisle width, anchor systems for wheelchairs, aids for visually and audibly impaired people etc.), but should also include possibilities for designing barrier-free bus stops (incl. kerb height/elevated platforms). However, these should just be guidelines so that transport operators have the possibility to consider the specific local needs.

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29 BVG Questionnaire for Municipal Transport Administrations
3.4 Trams

Apart from the fact that trams are not found in every city, trams do not top the list of the most preferred means of transport for people with disabilities, although with 44% it does come ahead of travel by taxi and by special dedicated services, each with 33%\textsuperscript{30}. They should also be oriented towards the needs of PRM.

3.4.1 Step-free boarding

The proportion of low-floor trams that transport operators already have in their fleets is still way below the comparable figures for the bus sector. This is because the development of low-floor trams started later and is slower than in the bus sector. The average life span of a tram car is 35 – 50 years and so much longer than that of buses with 10 – 15 years, and so the replacement of a fleet progresses much more slowly. It will still take some time before the switch to tram vehicles which are accessible to people with disabilities is complete.

In 1990, on average only 2% of the trams were low-floor (bus: 12%), in 1995 the proportion was 15% (bus: 31%), and in 2000 23% of the trams were low-floor (bus: 55%)\textsuperscript{31}. It will be another 40 – 50 years before a complete low-floor tram fleet can be expected in the EU Member States. The exceptions of course are cities with tram systems which have high platforms and therefore cannot operate low-floor vehicles. Instead, they have the problem that the high platforms require step-free access.

![Figure 16: Development of the rate of low-floor trams in surveyed cities](image)

The proportion of the low-floor coach floor refers to the entire length of a tram car which varies in the individual cities between almost 30% and 100%. Half of the cities with low-floor trams which were surveyed operate passenger cars which are 100% low-floor, a further 33% have vehicles where 70% of the floor is low-floor\textsuperscript{32}. How big this proportion is, has actually very little relevance for the accessibility of the tram system for people with walking disabilities as long as step-free boarding

\textsuperscript{30} BVG Questionnaire for Municipal Disabled Organisations
\textsuperscript{31} BVG Questionnaire for Urban Transport Operators
\textsuperscript{32} BVG Questionnaire for Urban Transport Operators
through one door can be assured. So a 100 % low-floor operation is a good service, but is not absolutely necessary. What is important is that the wheelchair bay and the seats for disabled people can be accessed step-free from the low-floor entrance. The steps within the vehicle leading from the low-floor section to the high-floor section cause a problem for the remaining passengers.

In trams the height difference when boarding is important. Those operators asked quoted a difference of between 24 and 35 cm between the top of the track and the floor of the carriage. This difference is generally overcome with appropriate platforms at stops/stations which reduce the boarding height to 0 – 5 cm. In cases where the stop is directly on the tracks, some transport operators have, in addition to low-floor technology, mechanical ramps or jack-up platforms in their tram cars in order to enable barrier-free boarding from the street surface. The vehicles of 20 % of the transport operators interviewed are fitted with jack-up-platforms or lifts, and 20 % have mechanical ramps to help wheelchair users board.

### 3.4.2 Meeting the needs of people with sensory disabilities

In contrast to the delayed conversion of the tram system to meet the needs of people with walking disabilities (low-floor vehicles), progress in equipping trams with special aids for people with sensory disabilities is comparable to the developments in the bus sector. Already 65 % of all tram cars have been adapted to the needs of people with visual impairments and 37 % of the vehicles have been adapted to the needs of people with hearing impairments. This development should be continued and it is important to encourage existing trams (and those with still many years of service) to be fitted with such aids. The effort required to fit visual and acoustic display/information systems is not excessive.

### 3.4.3 Tram stops

It is also especially important to adapt the tram stops to the needs of people with visual disabilities. There is a danger that people with visual disabilities can wander on to the tracks. With buses the danger that somebody is run over at bus stops is relatively small due to the short braking distance and the possibility of steering out of the way. However, with trams appropriate safety measures such as erecting safety barriers or using guiding lines for visually impaired people are unavoidable. The implementation of guiding systems for people with visual disabilities differs greatly among transport operators and the level of implementation varies between 0 and 100 %. However, the average of all figures is only 38.6 % of all tram stops. This shows that there is considerable space for improvement. Only 17 % of the tram operators asked have equipped all stops accordingly. Regulations are necessary which force transport operators to introduce aids for people with visual disabilities at all tram stops.

### 3.4.4 Tram deployment strategies

What is also interesting is that in the current phase of converting fleets to vehicles which are adapted to the needs of people with disabilities, the transport operators are trying to optimise the deployment of these new trams, too. The majority of the transport operators (73 %) deploy these vehicles on all routes – mixed with vehicles which are not adapted to the needs of people with disabilities – in order that all journeys on each route are accessible for disabled persons. The remaining transport operators prefer a complete deployment on selected routes. This is just a temporary problem and requires no further recommendations because the number of vehicles which are not adapted to the needs of people with disabilities is constantly decreasing and the vehicle deployment will soon cease to be an issue.

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Figure 17.: Percentage of tram stops adapted to the needs of visually impaired people

![Bar chart showing percentage of tram stops adapted to the needs of visually impaired people]

- 67%
- 33%
- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%

Source: survey

3.5 Underground and suburban railways

Although underground and suburban train systems operate only in some large cities, they also have to be designed barrier-free. The main obstacles to the accessibility of these fast train systems are on the one hand the lack of step-free accessibility of platforms and ticket halls as well as the absence of level boarding from the platform onto the train. Stations must be accessible for all passengers, i.e. there must be lifts and ramps suitable for wheelchairs if stations are not accessible from ground level. The proportion of ground level stations is very low among most cities surveyed36.

3.5.1 Accessibility of stations

The demands of barrier-free accessibility are currently being met in European cities in varying degrees. While with newer train systems this aim was considered already during the construction of routes and stations, older systems have the difficult task of converting their stations accordingly. That this step is already being taken (at least by those cities which responded) is shown in the proportion of suburban stops which are easily accessible for persons with disabilities. The proportion of stations adapted has risen only very slowly in the last 10 years. In 1990 only 16 % of stations met the needs of disabled people. This figure increased to 29 % in 1995 and 49 % in 200037. It can be assumed that this tendency will continue. One-third of the cities asked already have an underground system which is completely accessible to people with disabilities.

The problems are of course the enormous construction efforts required to fit existing stations with lifts as well as the huge costs involved. Of the 49 % of all stations adapted to the needs of people with disabilities 70 % have lifts leading down to the tunnels, a further 14 % have lifts to an elevated platform. But also ground level stations are equipped with a lift due to special local conditions (6 %), and so it is possi-

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37 BVG Questionnaire for Urban Transport Operators
able to achieve barrier-free accessibility in almost 90% of cases with lifts. This is also the most convenient solution for wheelchair users which can be recommended.

Figure 18.: Development of the rate of stations adapted in surveyed cities

![Bar chart showing the development of the rate of stations adapted in surveyed cities from 1990 to 2000.](attachment:chart.png)

Source: survey

Ramps which can be found in almost every tenth barrier-free station require considerable efforts to negotiate, at least for wheelchairs which require pure muscle power.

Figure 19.: Easy accessible underground and suburban stops

![Pie chart showing the distribution of accessible underground and suburban stops.](attachment:pie_chart.png)

Source: survey

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3.5.2 Boarding

A further problem is boarding rapid trains from the platform. Height differences often have to be negotiated, no matter how small, but often they cannot be negotiated by the wheelchair user. Older underground systems in particular have a step in the entrance to the carriage which is difficult to minimise. Wheel and track wear tolerance as well as load-dependent strain on the vehicle springs play a role. Lowering the vehicle floor to below platform level should be avoided due to the risk of stumbling upon leaving the vehicle (should all unfavourable circumstances coincide). In order to overcome this height difference, some operators use manually applied ramps, which does not present a long-term and advisable solution. Other examples show that by using modern technology (e.g. weight-dependent level control) level boarding is possible. Two of the transport operators surveyed gave the height difference of their underground system as 0 cm.\(^{39}\)

Then there is still the problem of bridging the gap between the edge of the platform and the floor of the coach. This obviously hardly exists in reality as almost all transport operators did not see the need for such bridging aids. One possibility is the use of automatic retractable ramps fixed to the vehicles which bridge this gap on stopping. Only two operators said they planned to introduce this technology in the future or have built it into the prototype of a new carriage model.

3.5.3 People with visual impairments

The degree to which stations have been adapted to the needs of visually impaired people is also fairly advanced. In the suburban train stations, orientation aids are just as important as at tram stops, however, here there is a possibility that a person with a visual disability does not recognise the edge of the platform and falls onto the tracks. All of the cities surveyed have started to carry out appropriate measures. Just over one-third of the underground transport operators even gave a figure of 100 % for this, most of the remaining transport operators have already adapted a third to a half of all stations. Thus, more than one half of underground stations in the surveyed towns meet the needs of people with visual impairments.\(^{40}\)

Figure 20.: Use of colour contrasting for visually impaired passengers

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\(^{39}\) BVG Questionnaire for Urban Transport Operators

\(^{40}\) BVG Questionnaire for Urban Transport Operators
All in all, the barrier-free design of all stations and vehicles of a suburban rail system is absolutely necessary, even if complete realisation, at least in cities with big and old underground networks, will still take several decades.

### 3.6 Further features/aid for persons with disabilities

Further aspects of barrier-free design of local public transport were also investigated in the questionnaires. Transport operators were asked whether they used colour contrasting for visually impaired people. 61% of transport operators said they used such methods, mentioning platform edges, handrails, stop buttons, exit markings and information elements.

A special question referred to the needs of deaf and hard of hearing passengers. 71% of transport operators said they used appropriate features. Screens and displays as well as visual departure and stop signs were most common. Some of the displays even provide real-time information, which of course provides added value^41^.

![Figure 21.: Use of visual information for deaf and hearing-impaired](image)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display signs on and in vehicles</td>
<td>33%</td>
</tr>
<tr>
<td>Display signs at stops</td>
<td>29%</td>
</tr>
<tr>
<td>Dynamic information systems</td>
<td>21%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
</tr>
<tr>
<td>No special information systems</td>
<td>33%</td>
</tr>
</tbody>
</table>

Source: survey

On the other hand, the special features for persons of small stature are not as advanced. Only 18% of the companies install special lower seats in their vehicles. Some of the transport operators have fixed operation elements for lifts and doors or specially applied holding rails quite low down. However, 45% of the operators have no special features for this group^42^.

Interestingly enough, 70% of all companies surveyed had specific training schemes for drivers and staff members. This does not only include training in how to deal with disabled people but also knowledge about the special facilities for this group. However, these training measures are restricted in some companies to those members of staff who work in disabled transportation services^43^.

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^41^ BVG Questionnaire for Urban Transport Operators  
^42^ BVG Questionnaire for Urban Transport Operators  
^43^ BVG Questionnaire for Urban Transport Operators
Finally, the questionnaires asked about other special developments/services to provide greater accessibility. Unfortunately, no essentially new ideas were forthcoming. An overview of the responses is provided in the following table. The table shows the approaches of the individual cities in the EU Member States to improve accessibility of public transport and does not represent the key initiatives in each Member State.

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44 BVG Questionnaire for Urban Transport Operators and Municipal Disabled Associations
### Figure 23.: Other accessibility features mentioned by survey respondents

<table>
<thead>
<tr>
<th>Country</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Tactile guiding system for the blind in underground stations, train arrival announcements in the underground, interlinked coaches, bright coloured strips by door buttons, acoustic signal in sensor buttons, multi-purpose compartments for wheelchairs and pushchairs, computer-aided control system</td>
</tr>
<tr>
<td>Belgium</td>
<td>Door-to-door minibus service. Widening of kerbs at stops.</td>
</tr>
<tr>
<td>Finland</td>
<td>A 10-year project has started in Helsinki to make the whole city accessible for everybody. Voice-, display- and mobile phone information that helps passengers in case of interruptions in public transport are under development.</td>
</tr>
<tr>
<td>France</td>
<td>Bus accessible PRM + ramp, accessible tramway, bus route development, development of metro stop, conversion of metro with vocal and visual signals.</td>
</tr>
<tr>
<td>Germany</td>
<td>Low-floor vehicles with lift, externally controllable stop and destination announcement system for visually impaired. In the tram-network all stations are being rebuilt with 340 mm high platforms at the moment, so you can get into the low-floor vehicles without any step. Visual info at tram stops, announcements of line and final stop in metro stations on arrival at stops; info in timetable which buses/trams are low-floor.</td>
</tr>
<tr>
<td>Greece</td>
<td>There are seminars which include information for the help of disabled people. Within a time schedule of 4 to 7 years from now all buses will be equipped with the special lift system.</td>
</tr>
<tr>
<td>Ireland</td>
<td>Website, public offices</td>
</tr>
<tr>
<td>Italy</td>
<td>All the new buses that will be purchased will be low floor, with wheelchair seats and lift, thanks to company's will and to the Regional Authority's requirements for funding. Visual information at bus/tram stops transformed in GSM vocal messages (for visually impaired persons). The system is being developed.</td>
</tr>
<tr>
<td>Portugal</td>
<td>Escalators, ramps, lifts, help points, orientation signals and general information provided by flyer distribution and directly by staff members. All the buses aquired since (around) 1998 are low-floor; Training for drivers is being studied.</td>
</tr>
<tr>
<td>Spain</td>
<td>There is a good relationship with the leaders of organisations of people with disabilities. Special entrance gates and places in trains for wheelchairs and prams.</td>
</tr>
<tr>
<td>Sweden</td>
<td>There is a research about road design to/from stops. The Regional Topic Group Traffic has defined what is meant by good accessibility for different functional disabilities in a green-yellow-red table.</td>
</tr>
</tbody>
</table>

### 3.7 Information systems

A further element of a barrier-free transportation system which should not be underestimated is the information system. A basic distinction can be made in information between the targets (lines, timetables) and the performance (e.g. delays, disruptions to service etc). With regard to the former, the basics are already available. Approximately 40 % of transport operators have information about routes for persons with disabilities. This includes network maps in Braille and audio-cassettes. 80 % of the operators offer special timetable and fare information for this group of people.\(^{45}\)

On the other hand, current information for people with disabilities is not so widely available. The use of displays, voice announcements or hotlines to obtain current information for people with disabilities must be encouraged to provide PRM with a

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\(^{45}\) BVG Questionnaire for Urban Transport Operators
basis for optimal planning of actual routes. So for example, if a lift is out of order at the transfer station, a wheelchair user may have to re-plan his route. Also, if part of an accessible underground station is temporarily closed off, (e.g. due to a passenger accident) and an alternative service is provided with buses which are not adapted to the needs of disabled people, this can also have consequences for the journey planning of wheelchair users.

Figure 24.: Special information services offered in the cities

<table>
<thead>
<tr>
<th>Service</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timetables for persons with disabilities</td>
<td>80%</td>
</tr>
<tr>
<td>Fares for persons with disabilities</td>
<td>80%</td>
</tr>
<tr>
<td>Routes for persons with disabilities</td>
<td>40%</td>
</tr>
</tbody>
</table>

* more than one answer possible

Source: survey

3.8 Financial aspects

3.8.1 Investment and operation costs

A barrier-free design of urban public transport can of course not be achieved without the necessary financial means. Additional costs are incurred not only for the re-design of facilities and the procurement of suitable vehicles, but also for their operation. In the following, the author will attempt to give a figure to provide municipalities and transport operators with a rough estimate of the costs involved.

For buses the additional costs for simple adaptation to the needs of people with disabilities is dependent of course on the extent of adaptation required. For example, fitting an electronic ramp into a vehicle costs approximately between 6,000 and 7,000 €, and a jack-lift costs 15,000 to 20,000 €\(^{46}\). In addition there are costs for operation and maintenance which also vary widely depending on local prices and salaries. The costs for the widening of the pavement at bus stops with new edging kerbs and a 24 m\(^2\) paved area is approximately 2,750 €\(^{47}\).

As for underground rail systems the costs for introducing a lift (turnkey) into an already existing underground station amount to between 500,000 and 2,500,000 €\(^{48}\). The price depends largely of course on local factors. Lower costs are involved for simple construction works, for example, when the roof of the tunnel has to be broken through. For complicated construction works which require the demolition of entire underground elements and necessitate groundwater conservation, the costs lie at the upper end of the given scale. In addition there are current costs for the operation

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\(^{46}\) Estimate by BVG Berliner Verkehrsbetriebe

\(^{47}\) European Conference of Ministers of Transport: Improving Access to Public Transport

\(^{48}\) Estimate by BVG Berliner Verkehrsbetriebe
of lifts; so one can estimate – depending on how great the demands on the lift are – annual maintenance costs of between 8,000 and 10,000 €\textsuperscript{49}.

### 3.8.2 Concessionary fares

There is no standard regulation on fare concessions in the EU Member States and therefore they are dealt with differently from one state to the other. In some individual states there are even regional differences. The fare reductions for people with disabilities are usually 50 % of the regular fare but in some cases are even higher, e.g. depend on the degree of disability. For certain disabilities, for example for blind passengers, in some countries there is free travel for the accompanying person\textsuperscript{50}.

This fare reduction reflects the social commitment of a country towards its disadvantaged citizens. Disabled people usually have a lower income than the average citizen, whereby this is partly due to the difficulties they have in coping with journeys/distances/mobility. This creates problems travelling to a regular job and thus restricts possibilities to earn money. Of course reduced physical or psychological abilities also play a big role.

There are fare reductions for people with disabilities in all 15 EU Member States for buses, and if operated also for underground and suburban trains. As for trams, only Greece and Portugal do not have such fare reductions\textsuperscript{51}.

**Figure 25.: Fare reductions for people with disabilities**

<table>
<thead>
<tr>
<th></th>
<th>Buses</th>
<th>Trams</th>
<th>Underground</th>
<th>Suburban railway</th>
<th>Ferries</th>
<th>Taxis</th>
<th>Minibus services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Belgium</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>(X)</td>
<td>X</td>
</tr>
<tr>
<td>Denmark</td>
<td>X</td>
<td>n.a.</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>Finland</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>France</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Germany</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Greece</td>
<td>X</td>
<td>--</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Ireland</td>
<td>X</td>
<td>n.a.</td>
<td>n.a.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
</tr>
<tr>
<td>Italy</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>(X)</td>
<td>X</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>X</td>
<td>n.a.</td>
<td>n.a.</td>
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<td>n.a.</td>
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<tr>
<td>Netherlands</td>
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<td>X</td>
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<td>X</td>
<td>--</td>
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<td>--</td>
</tr>
<tr>
<td>Portugal</td>
<td>X</td>
<td>--</td>
<td>X</td>
<td>(X)</td>
<td>X</td>
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</tr>
<tr>
<td>Spain</td>
<td>X</td>
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<td>X</td>
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</tr>
<tr>
<td>Sweden</td>
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<td>--</td>
<td>X</td>
<td>--</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: DG Employment & Social Affairs, European Commission

In some cities elderly people travel free of charge, while in other cities people with disabilities travel free. In between the two extremes there are many different categories. It seems, however, often to be decided locally which reduction is applied to which group of people as fare reductions ranged between 0 and 100 % for the surveyed cities\textsuperscript{52}.

\textsuperscript{49} Estimate by BVG Berliner Verkehrsbetriebe

\textsuperscript{50} European Conference of Ministers of Transport: Concessionary Fares

\textsuperscript{51} DG Employment and Social Affairs, European Commission

\textsuperscript{52} BVG Questionnaire for Urban Transport Operators, Municipal Transport Administrations and Municipal Disabled Organisations
In all EU Member States the conditions for fare reductions are the responsibility of the national authorities, in some countries even also of regional or local authorities and very rarely of the transit operators themselves. In most countries the conditions depend on age (except Greece) or on the degree of disability (with the exception of Belgium and Italy). Other, but less common criteria, include the type of disability, minimum income, domicile/nationality or war disability. In Ireland and Luxembourg a special identification card is required. This short list alone demonstrates that there are no standard criteria within the EU\textsuperscript{53}.

Compensation to transit operators for fare losses is directed by legislation and is normally paid from national public funds. However, regional or local public funds are also used in some countries for this purpose.

\textsuperscript{53} European Conference of Ministers of Transport: Concessionary Fares
3.9 Accompanying measures

Ultimately, the dialogue between the municipal administrations, the transport operators and people with disabilities or their associations should play a greater role in the planning and operational design of local public transport. While the municipal administrations, without exception, maintain a dialogue of some sort, 4% of the transport operators said they had never had contact to such organisations or did not even know them. Even 18% of disabled organisations complained that no structured dialogue takes place with urban transport operators or municipal authorities with regard to accessible planning for persons with disabilities.\(^{54}\)

Figure 27.: Existing structured dialogue with disability organisations

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\(^{54}\) BVG Questionnaire for Urban Transport Operators, Municipal Transport Administrations and Municipal Disabled Organisations
Thus the importance of maintaining a dialogue with disabled associations does not depend on the size of the city, although one could assume that in smaller cities it would be easier to have a better overview and there would be more possibilities for communication. On the contrary, in large cities a permanent dialogue between disability organisations and urban transport operators or municipal transport administrations was greater, namely in 61% of the cities and so much higher than in medium-sized and small cities, where, only half of the respondents could confirm that such permanent dialogues existed\(^{55}\).

In this area of co-operation much more communication is still needed. Only through dialogue can a mutual understanding be achieved of the existing problems of barrier-free accessibility and the problems in solving them.

Figure 28.: Dialogue with disability organisations and survey cities

The final question dealt with the existence of an urban development plan. About 86% of the cities have an urban development plan, but only in two-thirds of these cities are the needs of people with disabilities taken into consideration. The ways in which these needs were taken into consideration by the cities ranged from the involvement of people with disabilities in the planning process for the removal of barriers on public roads, to guiding and information systems for people with disabilities\(^{56}\).

The law-makers in each country are requested to enforce such considerations. One example is the new German law which is explained in more detail later.

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\(^{55}\) BVG Questionnaire for Urban Transport Operators, Municipal Transport Administrations and Municipal Disabled Organisations

\(^{56}\) BVG Questionnaire for Municipal Transport Administrations
Figure 29.: Consideration of the needs of PRM in urban development plans

Source: survey
4 Requirements for PRM and their implementation

4.1 Vehicle manufacturer questionnaire

The aim was to establish the state-of-art in technology in accessible transportation and to provide sound statements and recommendations. Questionnaires were developed for European vehicle manufacturers, with separate ones developed for manufacturers of rail-bound vehicles and of buses, respectively. The questionnaires requested information on the newest technological developments, where this modern technology was applied, costs and further potential for development. All big European vehicle manufacturers active in the public transport sector were approached. The feedback from vehicle manufacturers was 89 %.

4.1.1 Bus manufacturers

With regard to bus manufacturers, a decisive step in barrier-free travel has been achieved through the introduction of low-floor technology. The boarding step height is now only 32 cm. The kneeling system allows this step height to be further reduced to between 23 and 25 cm: at 20 cm high kerbs this means almost step-free boarding. The proportion of buses with the kneeling system sold by some manufacturers is already 100 %. Already two-thirds of all buses are delivered with mechanical ramps, while electrical ramps which are more expensive and more prone to breaking down are fitted in less than 10 % of buses.\textsuperscript{57}

Figure 30.: Features to help wheelchair and mobility impaired users board

<table>
<thead>
<tr>
<th>Percentage of vehicles respectively equipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kneeling</td>
</tr>
<tr>
<td>Mechanical ramp</td>
</tr>
<tr>
<td>Electronic ramp</td>
</tr>
<tr>
<td>Jack-up platform / Lift</td>
</tr>
<tr>
<td>84%</td>
</tr>
<tr>
<td>64%</td>
</tr>
<tr>
<td>9%</td>
</tr>
<tr>
<td>1%</td>
</tr>
</tbody>
</table>

Source: BVG Questionnaire for Bus manufacturers

When asked which door was considered optimal for disabled passengers to board, 80 % of the bus manufacturers surveyed named the middle door as the most convenient door for boarding and alighting.\textsuperscript{58} This corresponds with the assessments made by transport operators, who in most cases have assigned the middle door for boarding and alighting by wheelchair users.

\textsuperscript{57} BVG Questionnaire for Bus manufacturers
\textsuperscript{58} BVG Questionnaire for Bus manufacturers
Bus manufacturers were also asked about the restraint systems fitted into the vehicles which they deliver. It appears nowadays that the safety belt has been successfully implemented and is installed in 80% of all buses delivered\(^\text{59}\). On the other hand, the use of bayonet locks for the wheels of the wheelchair are relatively uncommon as are upholstery back rests. The disadvantages of a belt system have already been described in another section. Ideal would be the development of both a safe restraint system and one which is simple to use and does not require assistance from others.

\(^{59}\) BVG Questionnaire for Bus manufacturers
Other fitted features are safety belts for wheelchair users, lower seats (for people of small stature), lower stop signals, high colour contrasted handrails, highly contrasted step edges, optical and acoustic stop announcements. According to the manufacturers, the price for such additional features amounts to 1 – 2 % of the price of the vehicle and so should certainly be affordable.

The vehicles available on the market show that bus manufacturers are moving in the right direction. They therefore already fulfill the requirements described in the new EU Directive (2001/85/EC) concerning bus design and accessibility of transit buses for PRM. It is thus the responsibility of transport authorities and transport operators to ensure that only vehicles which are adapted to the needs of people with disabilities are procured and put into service. There is a wide range of technical equipment available.

4.1.2 Rail-bound vehicle manufacturers

Rail-bound vehicle manufacturers nowadays offer a wide range of vehicles which are accessible to people with disabilities. 70 – 100 % of the length of the most trams is constructed as low-floor. The boarding height from street level is 30 – 40 cm and in cases where there are platforms at the stops, the height difference can be reduced to zero. In addition, mechanical or electrical ramps can be fitted into the vehicles to overcome the difference in height, if an elevated platform is not available. There are also high-floor vehicles which are used by transport operators who have high platform systems. No further adaptations need to be made to the vehicles as the difference in height is overcome as soon as the vehicle reaches the platform. However, to cover the gap between the vehicle and the platform it is possible to fit an electric retractable ramp. Manually operated folding ramps are also provided by the vehicle industry.

The picture is similar for suburban railway and underground vehicles. It was previously considered that in order to ensure safe boarding for able-bodied passengers, the floor of the vehicle must be raised slightly higher than the level of the platform. For such cases portable ramps are available which can be operated by the public transit staff. With the newest generation of vehicles the difference between the platform and the inside of the vehicle has been minimised in order that people with walking impairments and wheelchair users are also able to board and alight without any problems.

For people with visual impairments and blind people, external tactile surfaces can be installed on the doors to make it easier to identify entrances. Inside the vehicle, visually impaired people are helped to get their bearings by means of vertical lines running along the length of the floor, similarly to those in aeroplanes, and which are colour contrasted and topographically emphasised. By means of a different levelled arrangement of handrails and handholds, it is possible from inside to enable visually impaired passengers to make out the exits. In addition, there are acoustic signals on doors which give warnings that doors are about to open or close. Visual announcements and displays are offered by the vehicle industry for audibly impaired.

4.2 Recommendations for the application of technical aspects

This section provides an overview and explanations of additional demands and needs of people with disabilities, in so far as they help shed light on the general problem of mobility for people with disabilities. However, this study does not provide a complete picture covering everything from the demands and needs for an accessible system to all regulations governing each aspect, as this would go beyond the boundaries of the study. What is more, there are already numerous recommenda-

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60 BVG Questionnaire for Bus manufacturers
61 BVG Questionnaire for Rail-bound vehicle manufacturers
tions from international and national organisations which could be called on for each individual case.

To create the right conditions for a local transport system which is adapted to the needs of disabled people, it is important to understand that the use of such a system can only be fully optimised if all links in the closed transport chain are developed accordingly. This includes buildings, access routes, stops and transport modes. Many framework conditions should be considered:

- Technical solutions
- Capacity and abilities of disabled people
- Safety of disabled people
- Effect on remaining passengers
- Impact on operation
- Time factor for the realisation of the measures
- Investment costs
- Operation costs
- Experiences gained so far.

In order to realise the demands and needs, it is necessary to identify solutions which correspond as far as possible to the needs of all transport users and the numerous disabled groups. Measures which are desired by one group of disabled people (e.g. same level between vehicle floor and edge of platform for wheelchair users) may not necessarily benefit another group (e.g. a slight difference in the level is needed for blind people for orientation purposes). Proper attention should be given to different views of individual disabled groups.

4.2.1 Buses and people with walking disabilities

Step-free boarding on buses is of course the biggest demand. This demand can easily be met by operating low-floor buses, which have a boarding height of approximately 32 cm. The EU Directive (2001/85/EC) was introduced in 2002 concerning bus design and contains demands for the improvement of accessibility of transit buses for PRM. These guidelines require, for example, that all vehicles with 8 or more seats for passengers should be made more accessible for PRM. This can either be achieved by means of technical adaptations to the vehicle or a combination of such measures with an appropriate design of the local infrastructure, which facilitates boarding for wheelchair users.

The Directive specifies that city buses should be manufactured with the low-floor system and be equipped with the kneeling system and a lift or ramp. This Directive has to be incorporated into the national law of each EU Member State by August 2003. From February 2004 permission to operate vehicles which do not comply with this Directive can be denied.

4.2.1.1 Kneeling and lifts

The kneeling system makes boarding even easier for people with walking disabilities. This system allows the height difference for boarding at the kerb to be reduced to 5 – 10 cm. Raising the kerb could reduce the level to almost 0 cm; under some unfavourable conditions a 5 cm difference cannot be exceeded.

An alternative to the kneeling system is the use of an integrated lift. The wheelchair user wheels himself onto a hydraulic platform which is then raised to the same level as the vehicle floor. Such lifts should be at the front of the vehicle so that the whole process can be monitored by the driver. The advantage of this system is that even greater heights can be overcome. However, there are also several disadvantages, for example:
• Long waits at stops which lead to time loss and delays
• It cannot be used by people with walking disabilities as it is not possible to hold on
• It increases the weight of the vehicle, higher energy consumption
• The system is prone to breaking down and requiring repair.

A further disadvantage of this option has already been mentioned in a previous section: the wheelchair user has to use the front entrance to get to the wheelchair bay. This means that several seats have to be removed in the front section of the vehicle to ensure the aisle is wide enough for the wheelchair to pass. This is inconsistent with the demands of wheelchair users and other passengers.

4.2.1.2 Ramps

Another possibility to make boarding easier for wheelchair users is to install a ramp which not only overcomes the difference in height, but also bridges the gap between kerb and vehicle. This uncomplicated feature can also be installed at the middle door. The manual folding ramps are easiest to use as they can quickly be folded out by the driver or by passengers. They are also the cheapest solution to acquire and operate. However, a longer distance has to be covered because otherwise the slope of the folded out ramp would be too steep; the slope should not exceed 12%.

A third alternative is a hydraulic retractable ramp which is fitted directly under the vehicle floor. The operation of the ramp does not even require the driver to leave his seat. The disadvantage of this option is that a small step still has to be overcome to enter the vehicle from the ramp. This height difference is difficult for wheelchair users to negotiate when wheeling upwards. In practice, this method is also prone to frequent breakdowns, particularly in bad weather conditions (rain, snow).

The precondition for achieving obstacle-free boarding is not only minimising the difference in height between the foothold area (kerb or stop platform) and vehicle floor, but also minimising the gap between the kerb and edge of the boarding platform. To reduce this gap, the bus must be able to approach the stop as closely as possible. This is best achieved by widening the pavement as mentioned in chapter 3.3. The pavement stretches out beyond the cars which are parked at the edge of the lane, so the bus can easily approach the stop without leaving its lane. It means that buses do not have to manoeuvre in and out of flowing traffic, and so it generally speeds up travel, thus benefiting all passengers.

4.2.1.3 Street level measures

It is also possible to combine such a redesign of the bus stops with a raising of the kerb to enable step-free boarding onto a kneeling bus. At the same time, these widened pavements create more space for passengers at bus stops and it is possible to erect a shelter. The widened pavements have the added advantage that when the bus draws up to the kerb at the bus stop, it does not go over the kerb with its front overhang (or when leaving the stop with its rear overhang); in the case of low-floor buses and raised platforms the vehicle floor can easily be grounded.

Bus stop bays, on the other hand, are not advisable. In such cases the kerb is set back so the bus has to do an s-shaped curve to pull up to the kerb. This has several disadvantages, including:
• Parked cars often hinder buses from pulling in and out of the bays
• The bus cannot pull up closely enough to the kerb
• The safety of passengers waiting at the edge of the pavement is endangered by the vehicle overhang
• Passengers are susceptible to other accelerating objects coming from the side
• A lot of space is needed for bays.
4.2.1.4 Vehicle interior measures

As for the design of the door area of buses, the wishes of the different PRM groups vary. People with walking disabilities and elderly people would like to have a holding rail in the middle of wide (double) doors. However, this makes it impossible for wheelchair users and people with pushchairs to board as the single door sections are not wide enough to pass. Therefore, in high-floor buses it is more convenient to have holding rails on the door wings or fixed to the interior walls as they do not hinder wheelchair users. In low-floor buses a middle holding rail is not necessary at all, because there is no step which people with walking disabilities have to pull themselves up.

The interior of the vehicle must be step-free at least in the area between the door and the wheelchair bay. This interior area for passengers in wheelchairs or with pushchairs must have enough space to manoeuvre and be big enough for two wheelchairs in order that two wheelchair users can travel together. The best place to assign for wheelchairs is as near as possible to the entrance and exit door. The most convenient is the middle door of the bus to avoid the complicated wheelchair manoeuvres which would be necessary if the wheelchair user boarded at the front and had to manoeuvre past the driver, between the wheel arches and around the passengers standing in the aisle. As already mentioned, the principle of using the middle door for wheelchair users can easily be implemented if mechanical or hydraulic ramps are used.

4.2.1.5 Wheelchair safety measures

The wheelchair bay has an anchorage system to ensure the safety of both wheelchair users and other passengers. Safety belts are useful, but only to secure the wheelchair itself. For their own safety, efforts should be made to require disabled people to carry and use their own additional safety belt to strap themselves into the wheelchair. The use of just one safety belt to simultaneously secure the wheelchair and the user is not recommended due to the force of the impact of the wheelchair on the user’s body in the event of a crash. This problem can be reduced if the wheelchair user sits facing the rear and fixes his wheelchair against a cushioned partition wall. However, this is only useful if in the event of a crash, the impact on the bus is from the front. Therefore, this option still requires the wheelchair and its user to be secured by a belt.

An alternative to the safety belt which is offered by vehicle manufacturers is the bayonet lock or a hook which secures the wheelchair at the wheels. However, tests have shown that the wheels cannot withstand the crash impact and bend. The only purpose of the safety belt and the bayonet lock, which are both presently used, is merely to protect the wheelchair user and passengers near them from injuries caused by the wheelchair accidentally rolling, sliding or tilting during acceleration under normal operating conditions. A safe restraint system which can be used for all wheelchairs is currently not available on the market. A lot of research is still necessary to develop and implement a standard system.

4.2.2 Trams and people with walking disabilities

It is necessary to have at least one step-free entrance per tram. A differentiation should be made between two different systems, tram systems with low level tram stop islands and those operating with high platforms and the respective high-floor vehicles, whereby the last option is fairly rare.

It must be possible to have at least one step-free entrance and exit in low-floor vehicles which today are in frequent operation. The floor height of modern low-floor trams is, similarly to buses, approximately 30 – 35 cm, and so not completely accessible. This can only be achieved if the vehicle can be accessed from an appropriately raised island stop. People with disabilities should board and alight using the first
The Accessibility of Urban Transport to People with Reduced Mobility

door, as opposed to the middle door used in buses. This door should only be used provided that this particular section of the vehicle has a low-floor (i.e. for carriages which are not completely low-floor). If the tram system has stops which do not have (slightly elevated) island stops and boarding occurs directly from street level, the low-floor vehicles should be additionally fitted with a ramp or lift in order to overcome the difference in height.

Many transport operators still use older high-floor vehicles, even without elevated platforms, simply because trams have a lifespan of 35-50 years, which is much longer than that of buses. However, vehicle manufacturers have also developed alternative solutions for high-floor vehicles. High-floor articulated vehicles can be fitted at a later stage with a low-floor mid-section, which at the same time increases the whole passenger capacity of the vehicle. Furthermore, it is possible to procure a low-floor side car which is attached to a high-floor power car thus enabling barrier-free operation. If boarding and alighting occur directly at street level, these supplementary low-floor sections require an additional manually or hydraulically operated ramp. If the gap between the vehicle and the edge of the platform is too big, these ramps can also be used to bridge this gap.

Tramway systems with elevated platforms do not have these problems. However, it is important to ensure that these platforms can be accessed by wheelchair users, e.g. by constructing ramps or small lifts. Ample space for manoeuvring should also be provided. For systems which combine high platforms in the inner city area with surface level stops, the installation of boarding aids such as lifts in vehicles is unavoidable.

Due to the relatively low acceleration and deceleration rates of trams and their heavy weight, a restraint system is not really necessary in case of a crash. The acceleration rates are well below those of buses. Apart from this, the demands for barrier-free accessibility and comfort for all passengers are the same as for buses.

4.2.3 Underground systems and people with walking disabilities

The most important structures to be accessed in underground systems are the stations. They must be accessible for all people, i.e. have wheelchair accessible lifts, walking pavements or ramps if the platforms are not ground level and have step-free accessibility. If these accessibility features are not in the main concourse, then directions must be given using wheelchair pictograms. Lifts should be arranged in such a way so as to ensure direct accessibility from the street surface to the platform. This is not always possible with lifts which are added at a later stage to older stations, i.e. it is necessary to transfer from one lift to another in the ticket hall or the intermediary floors. For all lifts, the entrances and exits should face each other if possible, so that the wheelchair user does not have to turn in the lift or manoeuvre out backwards.

Ramps enabling step-free accessibility of platforms should not have a slope of more than 6%. On long ramps, every six meters there should be level sections for the wheelchair user to rest. Ramps should have a smooth, but slip resistant surface. Due to the danger of slipping in wet weather and in frost, the ramps should all be under cover. Walking pavements can only be used easily by people in wheelchairs or with pushchairs. All other passengers with walking disabilities have trouble using them.

Timetables and system plans (city maps, network maps) should indicate which stations are accessible to wheelchair users. The location of facilities which are accessible to people with disabilities, e.g. lifts, ramps, telephones etc. should be clearly and adequately sign-posted within stations, especially transfer stations. Standard pictograms should be used.

In stations, a step-free transfer from the platform to the carriage must be made possible. Wheelchair users travelling on their own cannot negotiate a boarding height difference of more than 5 cm. If the difference is greater, the driver or station supervisor can attach a manual ramp which should be available at all stations. For the
sake of convenience, the first door should be used for boarding as it is nearest the driver.

Platforms and vehicle floors should be as close to each other as possible. Minimising the gap prevents the front wheels of a wheelchair from getting stuck. However, special attention should be paid to possible movement of the car body on the tracks as well as potential settlement and shifting of the tracks. Problems can arise when implementing both “step-free boarding” and “small gap when boarding” as doors opening outwards can then ram into the platform edge. In some cases, therefore, it is not possible to provide completely step-free boarding.

4.2.4 Ferries and people with walking disabilities

Accessibility of ships for people with walking disabilities should be clearly indicated. Access to the jetty must be step-free, the jetty should have a slip-resistant surface and be wide enough for a wheelchair to pass. Even if the ferry’s crew provide assistance, the ramp should not have a slope of more than 12 %.

On the ship, seats inside and outside as well as a toilet should be accessible to wheelchair users. The wheelchair should be able to pass under tables, and chairs should not be screwed down in order that space can be created for wheelchair users if and when required. It is recommended that a toilet adapted to the needs of people with disabilities and with an alarm should be installed on all ships where journeys last longer than 30 minutes. This is compulsory for all journeys lasting 60 minutes or more.

4.2.5 Requirements for blind and visually impaired people

The demands and requests of blind and visually impaired people are fairly broad. People from this group should only travel on their own on condition they have and are able to use appropriate skills which they acquired during a mobility training course. Interestingly enough, only very few blind people use guide dogs when travelling as mobility training places emphasis on the use of the cane. However, the needs of guide dogs should still be taken into consideration.

Today, tactile and colour contrasted guiding systems are frequently used to improve the orientation of visually impaired people. These grooved or knobbled slab elements made of concrete or ceramic, and in some rare cases from rubber or metal, are used both to signal dangerous areas and to provide orientation. Therefore, tactile guiding and orientation systems are essential to help identify staircases, lifts, obstacles on the platform and in the station. This includes guiding strips, attention drawing areas (e.g. in front of steps and lifts) and interception lines (e.g. in front of platform edges), for example, in the form of high contrasting colour tactile surfaces.

Bus stops should be identifiable with a strip (tactile ground element stretching across the pavement). The driver must stop directly at the specified spot. Apart from the bus stop itself there should be no other object present, e.g. street light, litter bin. Visually impaired people should be able to safely cross bicycle paths which run next to bus stops. A pedestrian crossing from the tram stop to the island should be quipped with a traffic signal for blind people.

Doors and operation elements for lifts must be easily identified with a tactile surface. The call button for the lift should be on a free-standing post or a side wall and not in a recess. An acoustic signal should sound when the lift car has been entered. The car itself should have holding rails or handrails. To define the position of the operational buttons in Braille, there should be a continuous handrail which should only be interrupted at the operational button panel. The Braille inscriptions must be on the buttons and not next to them. A voice message should provide information such as the floor level, necessity to transfer and journey direction.
The start and end of steps, as well as the landing between two sections of steps should be indicated with white contrasting colours as well as by a special tactile surface structure. Stairway handrails should begin one stride (approx. 70 cm) before the first step and the first section of the handrail should be horizontal. It should be possible to fully grasp the handrail and the handrail should be continuous. In addition to tactile floor surfaces, the edge of the platform should also have a white stripe with regular intervals. These intervals are to help establish whether the train is still in motion. In the walking and waiting areas on the platforms there should be no big objects or projections. Display cases, signs etc. on posts should be avoided. Unavoidable projections and obstacles (e.g. ticket punching machines) should be rounded to make them less sharp.

Doors and buttons to open them should have a colour contrasting design so that they stand out. In new suburban and underground trains they are integrated into the outer wall, whereas in the past they used to be in special door pockets. The position of the doors is now difficult for blind people to identify. Furthermore, in the new train models, door handles do not have an additional orientation feature and have been replaced by a touch button. This is why it is important that the doors have a vertically running rubber lip seal which juts out over the remaining door level and can be detected by the cane when feeling along the outside edge of the vehicle.

All operation buttons must be illuminated and be prominently displayed and not sunk set to ensure that they can easily be found and operated by disabled people. In the boarding areas, there should be slanting holding rails (e.g. on the inside of the door) inside the vehicle which lead to horizontal or vertical holding rails. Also, all holding rails should be colour contrasted with the remaining vehicle interior.

Apart from the use of tactile elements and heavily contrasting colours, the use of acoustics to convey information at platforms and at stops as well as in vehicles is important. This applies in particular to information on route numbers, destinations, names of stations, and possibly service disruptions. It also includes providing information in the trains about any changes to the side on which to alight. All movement processes of technical features should continue to give acoustic signals, e.g. opening and closing of the vehicle and lift doors, as well as the operation of jack-up lifts and ramps.

Tactile structural plans of the important stations should be published for blind people to help them get their bearings. Timetables for blind people should be supplemented with information about stations (location of exits, stairs, transfer points). Blind and visually impaired people in particular should be informed about closed exits, stairs which are out of order, closures due to building work etc. In general, attention should be paid to operation and service elements being positioned in the same place and having the same layout. They should be easily identified by touch or optically.

### 4.2.6 Requirements for audibly impaired people

The demands and needs of audibly impaired people are aimed at more visual information. This is already practised by most transport operators in their general efforts to improve service. This information refers to both data on regular operation (lines, timetables etc.) as well as information about current changes to services, for example, due to disruptions. All optical information should meet cognitive criteria, concerning lettering size, colour intensity, contrast etc. and also take into account the needs of disabled passengers. All information must be able to be read reflection-free. For telephone communication with the central information office of a transport company an appropriate form of communication should be available, e.g. an Internet connection or a text telephone.
5 Legislation and National Action Plans

5.1 Legislation at EU-level

Most EU Member States are aware that difficulties in accessing urban transport often make PRM feel excluded. Therefore, improving the accessibility of public transport for PRM is nowadays a stated policy objective, which can be perceived by the introduction of legislation and the progress which has been made during recent years, even though this varies from country to country.

One of the steps carried out by the authors was a complete review of current legislation both at EU and at national level\(^{62}\), as well as an assessment of the extent to which this legislation is enforced. The main aim of this review was to ascertain the existing barriers to accessibility of urban transport and to evaluate the gaps and the needs expressed by PRM. The aforementioned review was based on the information and data collected from the questionnaires mentioned above.

In order to enable such an evaluation and assessment, an analysis pattern was taken into account, which contained the most important requirements regarding suitable public transport for PRM:

- Vehicles – specifications for use by PRM of the different means of public transport
- Infrastructure – regulations concerning accessibility at rapid-transit railway platforms, underground stations, tram and bus stops
- Transport services offered – specifications concerning stop density, timetables and special dedicated services for PRM
- Information systems – signs, announcements and service information systems which facilitate mobility and eliminate disadvantages for PRM
- Costs and financing – survey of capital outlays, operating costs and transport costs.

In the long-term, the aim of the European Commission, together with associations of transport authorities and operators, is to encourage the development of a public transport system which is accessible for all persons. In 1993, following the request of the Council, the Commission developed an Action Plan for Accessible Public Transport.\(^{63}\) Taking into account the principle of subsidiarity, the measures outlined in the plan continue to be implemented wherever technology permits. In addition, the White Paper on Transport Policy\(^{64}\) identified guidelines to be followed to improve and achieve accessible urban transport for persons with reduced mobility. In addition to legislative initiatives, the Commission has focused its efforts in areas related to support for the improved understanding of accessibility issues; support for research, technological development and demonstration activities; and information and exchange of best practice.

On the legislative side, the European Parliament and the Council of the European Union have adopted the Directive relating to special provisions for vehicles used for the carriage of passengers comprising more than eight seats in addition to the driver’s seat (Directive 2001/85/EC). The principal aim of the Directive is to guarantee the safety of passengers. Therefore, it also considers necessary the provision of technical specifications in order to allow accessibility for persons of reduced mobility to the vehicles covered by the Directive through technical solutions applied to the vehicles or by combining them with appropriate local infrastructure to guarantee access for wheelchair users.

In accordance with the Directive 2001/85/EC, Member States are free to choose the most appropriate solution to achieve improved accessibility in vehicles other than those of Class I (vehicles with a capacity exceeding 22 passengers and constructed

\(^{62}\) A summary of national and EU legislation can be found in Annex III.


with areas for standing passengers). However, if vehicles other than those of Class I are equipped with devices for PRM and/or wheelchair users, they shall comply with the requirements for technical devices concerning:

- steps and their height, minimum depth, maximum slope, width and shape;
- priority seats for passengers with disabilities and space for passengers with reduced mobility;
- communication devices which shall be placed adjacent to any priority seat and within any wheelchair area;
- pictograms for vehicles fitted with wheelchair spaces and/or priority seats;
- floor slope that shall have a non-slip surface;
- wheelchair accommodation provisions;
- stability of wheelchairs through restraining systems;
- door controls;
- lighting;
- provisions for boarding aids such as kneeling systems, lifts and ramps.

With regard to other means of transport, a COST project was developed (COST 335), together with ECMT (European Conference of Ministers of Transport) and UIC (Union internationale des chemins de fer) on passengers’ accessibility of heavy rail systems. Its aims are to draw best practice in all aspects of rail travel concerning the needs of persons with disabilities and elderly people and to recommend best design practice.

The Directive on high-speed rail interoperability makes reference to ‘essential requirements’ which are detailed in the Technical Specifications for Interoperability (or TSIs), adopted by the European Commission in May 2002. These TSIs specify that railway companies have to ‘take the necessary measure to guarantee the access of persons of reduced mobility to the operated vehicles.’ The TSIs also require provision of adequate access from platform to train, and specify that high-speed trains should be equipped with an adapted toilet, space for at least one wheelchair, and doors of sufficient width. The directive on conventional rail interoperability also makes reference to a number of infrastructure and rolling stock requirements for people with reduced mobility.

In addition, a consultation paper on International Rail Passenger Rights and Obligations was drafted by the Commission in October 2002. Among the proposed measures, the document clearly sets out the services required by people with reduced mobility including additional information requirements, training of railway staff with regard to assistance, consultation with disability organisations, and the implementation of interoperability specifications regarding accessibility.

### 5.2 National legislation

In the questionnaires the 15 Member States were asked whether there is legislation at national level regarding the accessibility of urban transport for people with reduced mobility. In addition to national laws, some countries also provided reports and memoranda which do not constitute legal regulations.

The main objective of this research was to ascertain the legal requirements in each country with regard to improving the accessibility of urban transport for PRM and to

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make a comparison with the regulations of other Member States and with EU legislation.

When reviewing the legislation only the aspects relevant to the study were considered. Since laws differ substantially from country to country, all statements of a law cannot be taken into account, otherwise it would not be possible to make a comparison between the laws of the different countries. Therefore, only the requirements dealing directly with local public transport have been taken into consideration.

Most countries provide legislation concerning the accessibility of urban transport for PRM. Nevertheless, the regulations relating to the above-mentioned aspects differ across the European Union as there are substantial differences between national policies, thus making a comparison more difficult. It is also important to mention that in some countries the regions have a wide responsibility for regulations concerning transport accessibility policy as well as their application and enforcement.

Belgium, Greece, Ireland, Luxembourg and the Netherlands do not have legislation at a national level on the accessibility of urban transport for people with reduced mobility. In Belgium, the requirements regarding accessibility for PRM only refer to public buildings, which have to be accessible to people with disabilities. In Greece there is also only one national law on the improvement of accessibility of existing buildings through the introduction of lifts. In Ireland there is a similar law in Ireland which contains stipulations on the accessibility of transport terminal facilities for people with disabilities.

In the Netherlands legislation containing detailed accessibility requirements is under development. A Dutch version of the US Disabilities Act is being developed.

It was particularly noticeable that most countries have legislation on access for people with reduced mobility to public buildings, including transport terminals, through the removal of urban and architectural barriers. However, regulations on access to urban transport are more limited.

Some countries have very detailed and specific guidelines or regulations such as Germany, Sweden and the United Kingdom. In countries where regulations are vaguer, it provides the opportunity for laws and guidelines to be interpreted to suit the needs of the respective party. Yet on the other hand, even the most comprehensive guidelines look wonderful on paper but are worthless if not enforced.

Transport companies and authorities should be encouraged or even obliged to consult with disabled associations when planning public transport. This is practised to varying degrees in the Member States. As people with disabilities are greatly affected by any changes to public transport, it is highly advisable to include them in discussions to ensure that all aspects are considered before sometimes expensive measures are introduced which traffic planners consider “appropriate” for people with disabilities.

To sum up, national legislation on the improvement of the accessibility of public transport for people with disabilities differs greatly from one Member State to another. France, Germany, Italy, Sweden and the United Kingdom have very detailed and comprehensive regulations, however, even here not all aspects of an accessible urban transport system are regulated by national law. These are in particular binding statements about the necessary development of infrastructure and transport services as well as regulating how the costs should be borne.

Before the existing national laws are described in detail, an overview must be provided of the existing regulations in the individual countries. In France, Germany, Italy, Sweden and the United Kingdom there are references about the design and the equipment of vehicles, and France, Germany, Italy, Portugal and Sweden make statements about the necessary infrastructure. Demands on special dedicated serv-

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ices can be found in the national laws in Denmark, Finland, France and Italy. Data about information systems on barrier-free services exist in French, Swedish and UK laws. Regulations on costs and financing exist in Austria, Finland, France, Germany, Italy as well as Spain.

Figure 33.: Regulations relating to accessibility in EU Member State legislation

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5.2.1 Vehicles

In the United Kingdom, the Disability Discrimination Act 1995 introduced a civil rights approach for disability issues. It contains a separate part which covers public service vehicles as well as taxis and rail vehicles. The Act also provides the Secretary of State with powers in order to make accessibility regulations for each type of vehicle. Under the Act two sets of regulations have been made – the Rail Vehicle Accessibility Regulations 1998 and the Public Service Vehicles Accessibility Regulations 2000 – which contain technical specifications of the vehicles including detailed requirements. The regulations comprise means of access and requirements for vehicles equipped for the carriage of wheelchair passengers and cover areas such as door controls, maximum step heights, floors of areas used by passengers, requirements for slip resistance surfaces, colour contrasting handrails and handholds, priority seats, dimensions of doorways and gangways as well as boarding and communication devices.

In Sweden, when public passenger transport is planned and implemented, the special needs of the functionally disabled must be taken into consideration. Therefore, the means of transport that are used shall as far as possible be adapted for passengers with functional disabilities. Detailed specifications are given to buses concerning signs, advertising, steps, doors, handles, handrails, and supports, seats, lighting and floor material as well as wheelchair user boarding and spaces. In May 2000 the Government made a decision in the form of an act which plans to create an accessible society for people with disabilities. A part of this project refers to public transport which requires public transport to be fully accessible by 2010. In 2003 the national administration authorities for the different modes of transport will present a plan on how this will be achieved.

In Germany, the federal structure is reflected within the competence allocation in the traffic sector. Public urban transport as well as regional and local transport come under the authority of the federal states and the regional administration. At national level, the requirements concerning the vehicles allude mostly to planning permission if the changes of equipment are of significant importance. In order to meet the goal of providing barrier-free access in local public transport, it is stated that the organisa-
tions responsible for public transport must ensure that the new vehicles are designed in such a way that people with disabilities can use them without serious difficulty.

In the Netherlands, public transport authorities are by law obliged to contract out for accessible public transport services only. Legislation on equal treatment of people with disabilities is under discussion in Parliament.

In Italy, the requirements for public transport vehicles include the minimal number of places reserved for people with disabilities. It also makes specifications on access of wheelchair users to the interior of the vehicle as well as the provision of sufficient space to park a wheelchair and anchorage. At regional level, nearly all regional administrations have passed legislation regarding accessibility of transport, usually delegating responsibility for implementation to local authorities.

Both France and Spain have national regulations which only refer to a gradual adaptation of public transport in order to facilitate the mobility of PRM. In Portugal, such regulations only apply to taxis.

Nevertheless, the Spanish State has adopted a decentralised structure. Regulatory powers on urbanism, housing and transport are gradually being delegated to the 17 autonomous communities.

When comparing the legislation at national level with legislation at EU level, both the United Kingdom and Sweden appear to be the countries which meet the regulations at EU level concerning buses and their requirements.

The other Member States just make general references to those technical measures and, as mentioned above, some of them do not allude at all to vehicle regulations in order to make those vehicles accessible to people with reduced mobility.

The safety of passengers is paramount and, as in the United Kingdom, provisions should be made throughout the EU to enforce a double restraining system for wheelchair users and the wheelchairs themselves.

5.2.2 Infrastructures

National legislation regarding infrastructures appears to be very limited. As mentioned earlier, most countries just make references to the elimination of architectural barriers. The goal is the elimination and the prevention of disadvantages of disabled persons as well as the guarantee of equal rights for them.

Both the United Kingdom and Germany have Disability Discrimination Acts which state that nobody shall be disadvantaged because of their disability. Therefore, public ways, places and roads as well as public accessible transport installations and conveyances in public passenger transport are to be arranged barrier-free.

Both France and Italy, as Portugal, introduced specifications relating to lifts and ramps as well as their measures. Nevertheless, most of these measures only refer to underground stations.

5.2.3 Transport services offered

With respect to transport services offered, only Finland, France, Italy, Denmark and Sweden have regulations concerning special transport services. National legislation just makes general references concerning regulations on stop density and timetables. These requirements come under local responsibility.

In Finland, the application of the Act on Services and Assistance for Disabled People and Decree on Support Assistance for Disabled People (both from 1987) is the responsibility of the municipalities. The Decree provides that people with severe disabilities are able to undertake at least eighteen one-way journeys each month pertaining to daily life, in addition to the travel necessary for work and studies.
The Internal Transport Orientation Act from France states that special measures may be taken in favour of people with mobility disabilities within the framework of the right to transport, in particular those in insular parts, remote areas or with difficult access to their own territory.

In Italy, the elaboration of plans relating to mobility of people with disabilities take into consideration alternative services for the areas not covered by public transport services.

In Denmark, special regulations on facilitating the transport of people with severely reduced mobility were included as amendments to the legislation on public transport. It requires the county councils to set up transport services for persons with severe physical disabilities in order to provide transport for treatment, therapy and the like. The arrangement must also open the possibility of transport beyond the county borders.

In Sweden, those supervising public transport and those running such transport services must ensure that transport is adapted for passengers with functional disabilities.

5.2.4 Information systems

The legal data on information systems for disabled people is very limited. Data from France and the United Kingdom mention light signals close to the doors and signs close to priority seats indicating that people with disabilities have priority for the use of those seats. With regard to trains, trams and buses, the United Kingdom’s national legislation has regulations on audible warning devices fitted in passenger doors as well as the indication of route number, destination and the next stop of the vehicles.

As for announcements, the United Kingdom appears to be the only country which provides specifications which cover, for example, audible warning devices and the indication of route name and number, the destination of a vehicle and the next stop. References are also made to audible signals for any power-operated boarding lift or ramp of a bus during operation.

In Sweden, the specifications which concern the information systems refer only to bus models from 1989 or later. The needs of persons with hearing disabilities and persons with visual impairments must be met in an appropriate way. Therefore, references are made to the number and destination of the vehicle, by means of line maps, hearing loop or sign arrangement as well as signal lines/stripes or signal buttons for disembarking.

A uniform system across the EU for colour contrasting and positioning of handrails, door controls in vehicles and in lifts, signposting etc. would facilitate mobility for PRM when leaving their everyday environment.

5.2.5 Costs and financing

Most countries provide some form of financing for the transportation of people with reduced mobility, in particular concerning transportation costs. Belgium, Denmark, the United Kingdom, Sweden and Portugal do not have regulations concerning capital outlays and costs.

In Germany, there are regulations including financial assistance for transport projects, construction or development of transport terminals, acceleration measures for public transport and for modernisation and equipment of existing vehicles. Low-floor vehicles and stop adjustment are totally or partly subsidised. The federal government can promote those projects through financial assistance grants and shall take into account the interests of people with reduced mobility and the requirements for barrier freedom. As for transportation costs, people with severe disabilities are entitled to free transport from public transport operators on presentation of an identification document. The costs for free transport are covered by the federation.
In Italy, the adaptation or substitution of the means of transport are subsidised by the Minister of Transport.

In France, accompanying investments regarding safety and accessibility and special services for PRM are subsidised by the State. People whose income is lower than what is fixed by law benefit from passes entitling them to use transport services with a reduction of at least 50 %.

In Austria, the Federal Law on the Ordinance of Local and Regional Public Transport (ÖPNRV-G) has been in force since 2000. The law applies only to financing from federal funds for the improvement of accessibility measures through consideration of the needs of persons whose mobility is affected by their physical impairments.

5.2.6 Other specifications

In addition to the regulations concerning the above, general specifications on accessibility and usability by PRM are mentioned regarding buildings, private transport and other means of transport.

Both Portugal and Sweden, as Italy, have provisions to facilitate the use of private cars for people with disabilities.

In Portugal, there are numerous Portarias, Decree-Laws, Regulations and Orders on tax-free purchase, vehicle marking and special parking rights for persons with disabilities who own a private car.

In Sweden, grants are available to subsidise the purchase and adaptation of private cars for those with severe and permanent disabilities as well as for parents of children with severe disabilities. People with disabilities may also be exempted from local parking regulations and may have access to special car parks.

The laws in Italy also take into account the private transportation of people with permanent disabilities who are entitled to reduced fares and fixed parking spaces.

In Denmark, transport companies have an obligation to provide individual transportation for persons with severe physical disabilities for trips in addition to those for treatment, or therapy.

There are several norms, codes, guidelines and recommendations within the field of transport for people with disabilities. However, the present review has not been focused on those regulations and recommendations.

Needless to say, legislation alone does not guarantee improved accessibility. Legal support must be prepared together with key actors and supported by detailed regulations incentives and information campaigns for those concerned.

It is also important to make a distinction between the different legislative “cultures” in the countries. During the review, the Consultant observed that legislation was either too general or too detailed, which made the comparison between the different Member States and with legislation at EU level very difficult.

5.3 National Action Plans

Based on the same analysis pattern used for the evaluation and assessment of the legislation at EU and national level, the Consultant assessed and reviewed the EU National Action Plans and their statements on the accessibility of urban transport and analysed their consistency with the transport policy of the EU. The Consultant has also made a comparison between the different National Action Plans.

In March 2000, the European Council of Lisbon agreed on the need to combat poverty and social exclusion, which should be based on an open co-ordination method, combining common objectives, National Action Plans and a programme presented by the Commission to support co-operation in order to enlarge the effectiveness and
efficiency of policies against social exclusion. The enhancement of this effectiveness would be enabled through:

- improvement of the perception and comprehension of social exclusion and poverty;
- exchanges on policies which are implemented and promotion of a mutual learning in the context of national action plans;
- development of the capacity of actors to promote innovative approaches.

National Action Plans on social inclusion and against poverty (NAPs) have been drawn up by all EU Member States for the period between 2001 and 2003. These plans have been submitted in response to the common objectives on poverty and social exclusion agreed by the EU in Nice in December 2000. The NAPs present priorities and efforts on social inclusion promotion and combating poverty and social exclusion. The goal is to guarantee access to resources, rights, goods and services as well as to promote the equality of social participation opportunities.

Once more, when reviewing the NAPs developed by the EU Member States only the statements dealing directly with local public transport were considered. Nevertheless, the NAPs refer to the accessibility of urban transport for PRM only in a general way.

5.3.1 Accessibility to vehicles and infrastructure

The United Kingdom, Ireland, the Netherlands, Portugal and Spain provide general statements regarding the improvement of accessibility measures for people with disabilities.

In December 1997, the Prime Minister of the United Kingdom set up the Social Exclusion Unit (SEU). The SEU devotes time to participating in wider interdepartmental work on social exclusion which also has a close bearing on transport. The UK also has a Disability Rights Commission whose objectives are the withdrawal of barriers that disadvantage people with disabilities, and strategic interventions in the transport and mobility sectors.

One of the tasks facing the Netherlands is the improvement of the accessibility of public transport for people with a physical disability in order to allow participation in society. Therefore, the Government is taking measures such as the promotion of the accessibility of public transport and special provisions for a better integration into the public transport system of persons with a physical disability.

One of the goals of Portugal’s NAP is the development of a national action plan on rehabilitation and integration of people with disabilities. This plan shall present the accessibility to transport as a basic intervention area in order to enable the cultural, social and economic participation of people with disabilities.

In Spain, to improve the situation of people with disabilities who are excluded, the NAP set up the Plan on Accessibility as well as programs on urban and architectural accessibility with regard to transport in collaboration with other public administrations and NGOs.

Ireland is the only country whose NAP contains more detailed statements concerning vehicles and infrastructures. With respect to vehicles, the plan refers to policies regarding the introduction of low-floor buses in urban areas and the process of making all taxi vehicles wheelchair accessible by the end of 2003. With relation to infrastructures, the NAP stipulates that all new and upgraded bus stations financed under the National Development Plan 2000 – 2006 will be accessible to people with mobility impairments and with disabilities.
5.3.2 **Transport services offered and information systems**

Only Germany has specifications with respect to transport services offered. Nevertheless, it is only mentioned that many authorities have set up special transport services for people with disabilities.

The national action plans on social inclusion and against poverty do not make any reference to stop density and timetables.

With regard to information systems for disabled people, the specifications appear once again to be very limited, or rather not-existent. These systems appear though to be very important for passengers using public transport, especially for those with hearing disabilities or visual impairments.

5.3.3 **Costs and financing**

The specifications on costs and financing mentioned in the NAPs appear to be more detailed but they are still very rare. Special reduced prices in public transport and, in some cases, free transport are the policies in Austria, Denmark and Germany.

In Austria, the federal Government, federal states and municipalities offer special reduced fares to people with disabilities and senior citizens. In some cases free transport is provided for persons attending cultural, educational and recreational events.

One of the main objectives of the Danish Government’s policy on persons with disabilities is wherever possible to afford them equal opportunities of participating in regular daily life as well as to provide relevant service and support. It is therefore policy to grant subsidies to local authorities. One of the schemes is consequently to grant free transportation for persons with disabilities to and from treatment and activities and interpersonal relations.

In Germany, people with disabilities are eligible for reduced fares in public transport. Further, persons with a serious mobility disability and blind people can travel free of charge as can people accompanying them. This guarantees improved access for all to training, justice and other public and private services.

5.3.4 **Other specifications**

In addition to the above-mentioned regulations, general specifications on accessibility and usability by PRM are mentioned regarding buildings and other means of transport.

When reviewing the National Action Plan on social inclusion of the individual EU Member States only Ireland, Italy and Sweden have statements concerning access to public buildings which are frequented by people with disabilities. Such access shall be adequate, not just reasonable. Therefore, the suppression of urban and architectural barriers is much more likely.

As for long-distance transport, Ireland’s NAP makes references to financing of railway stations as well as light rail vehicles and suburban railcars. It is mentioned that all new and upgraded rail stations financed under the National Development Plan 2000 – 2006 (NDP) as well as all light rail vehicles and suburban railcars will be accessible to people with mobility impairments and persons with disabilities.

As the Nation Action Plans on social inclusion and against poverty have regulations which are too general, it is almost impossible to make a comparison with the policies at an EU level. One can mention that, with regard to accessibility of urban transport for people with reduced mobility, no NAP has technical measures applicable to means of transport and transport infrastructure. Nevertheless, one shall take into account that the NAPs are policies at a national level, which do not refer only to urban transport, but to social inclusion in general, as well as to poverty.
6 Recommendations and observations

6.1 Aims for improving the situation of PRM

This study has confirmed that, despite widespread improvements during recent years, there is a continuing need to improve the accessibility of public transport for people with reduced mobility (PRM) in all EU Member States, thus enabling those people with mobility or travelling difficulties due to permanent or temporary physical disabilities to participate more actively in society. This is therefore a very important task from both a social and transport policy perspective. Mobility is essential for personal, social and professional development and therefore accessibility to public transport is of fundamental importance to people with reduced mobility.

6.1.1 People with reduced mobility

The PRM group can be roughly divided into people with disabilities and elderly people over the age of 65. The group of people with disabilities includes wheelchair users, mobility impaired, people who have difficulty walking and/or standing and those with difficulties gripping/holding (physical disabilities), blind, visually impaired, deaf, audibly impaired (sensory disabilities), people with orientation problems or speech impairments (mental and psychological disabilities) as well as persons of small or large stature.

But in actual fact people with disabilities make up the smallest proportion in the whole PRM group. The largest group of PRM are people with age-related mobility restrictions. This is the group of elderly people over 65; this group is already mobility restricted due to age alone.

The PRM group also includes small children under the age of 3. Finally, people with temporary impairments also belong to the group of PRM. This includes persons impaired due to temporary injuries or illness, expectant mothers and people with pushchairs or heavy luggage. All these people encounter difficulties when using public transport.

Looking at just the figures for the two largest PRM groups which are mentioned above (people with disabilities and people aged 65 and over), they number approximately 99 million. Of these, 37 million are severely or moderately disabled, and a further 61 million belong to the 65 and over age group. Thus it can be said that about 26 % of the population is permanently mobility impaired. This also includes people who have difficulties using buses and trains.

And the number of PRM in the EU Member States is steadily rising. This is due in particular to greater life expectancy and consequently to a growing proportion of elderly people whose mobility is increasingly impaired by age. Thus, the number of people requiring assistance in using the various transport means is increasing.

The percentage of people over the age of 64 in the EU States has grown in the last 10 years from 14.6 % to 16.3 % and the tendency is for this number to grow. Due to the rising population figures, the total number of people over 64 in the EU has increased in the same period by 14.9 %. This means that more and more people have reached an age which brings with it physical and mobility problems.

By the year 2010 Eurostat estimates that the number of people aged over 65 will have increased to 70 million, which is 15 % more than in the year 2000. If the number of disabled people experiences a similar increase, this would amount to some 43 million in 2010. This would mean that in 2010 there would be 113 million people in the EU who are mobility restricted. This scenario must be taken into account accordingly when developing barrier-free urban transport services.

In addition it is important to remember that the mobility of people in general and that of PRM is growing. With regard to the latter, this involves the creation of a barrier-free public transport system. Everyone has the desire to be mobile and this can also
only be completely achieved by PRM if the urban transport system is developed. The surveys conducted within the framework of this study have shown that the present degree of mobility of PRM does not yet correspond to their needs and wishes. This is reflected, for example, in the transport mode selection. In most cases PRM have to use taxis, a very expensive form of transportation, because it is not possible to use urban public transport due to barriers. In actual fact, most PRM would prefer a local public bus and rail system which is adapted to the needs of people with disabilities.

For all these people it is necessary to provide an environment which is almost completely free of barriers. With regard to public transport this means that all transport systems and facilities as well as information systems should be functional and accessible by all people without causing any special difficulties and without the need of assistance.

6.1.2 Obstacles for PRM using public transport

There are a number of difficulties facing PRM when using public transport. The first problem is the route from the home to the stop or station. Kerbs, pedestrian subways or footbridges are all obstacles to step-free accessibility of buses and trains for people with walking disabilities. So even before boarding a bus or train several barriers to accessibility have to be overcome, the removal of which does not directly lie within the power of the transport companies. Road signs and advertising hoardings pose major problems for people with visual disabilities.

Most transport modes cannot (yet) be accessed or boarded step-free. In buses and trams the boarding height is in many cases too high and so wheelchair users and people with walking disabilities have difficulty boarding and alighting. Even buses with a low boarding height can often not be accessed by these people. Cars which park illegally at stops make it virtually impossible for buses to pull right up to the kerb, thus creating a gap between the pavement and the vehicle which cannot easily be overcome.

At stations the platforms, whether on the surface or below ground, are not accessible step-free and so wheelchair users and people with walking disabilities have to rely on help from others to get to their trains. Blind people and people with visual impairments also encounter difficulties because there are often no guidance and orientation systems in the stations. The routes to the lifts are often badly signposted. On the whole there are many structural and architectural barriers in public transport. These stem from the fact that at the time of construction little thought was given to the needs of PRM.

PRM are faced with further obstacles in vehicles. This spectrum ranges from steps in the vehicle interior to out of reach operational units e.g. door opening buttons, to absent tie-back systems for wheelchair users. These systems do not only ensure the safety of the wheelchair users but also that of the other passengers, protecting them from uncontrolled wheelchair movements. Overcrowded buses and trains which a wheelchair cannot board also create mobility barriers.

Finally, problems are also common in cities where the public transport system has so far only partially been adapted to the needs of people with disabilities and so only some parts of the transport chain can be used by PRM. A lack of information can mean that although people with disabilities can board a train without any difficulty, they may not be able to get out at the station at their destination, or when transferring it may not be possible to continue their journey. Information about services adapted to the needs of people with disabilities is therefore just as important as providing these services themselves.

6.1.3 The solution: public transport adapted to the needs of PRM

It is interesting that all cities which took part in the study survey are moving away from the old philosophies of an exclusively dedicated transport service and are fa-
vouring a public transport system which is designed to meet the needs of people with disabilities, either on its own or in conjunction with a special dedicated service. Only barrier-free buses and trains can meet the demands of people with disabilities for unrestricted mobility in a comprehensive and cost-effective way while at the same time benefiting other passengers. Measures which enhance the accessibility and use of public transport by PRM are ultimately also beneficial to other passengers. There are benefits for each passenger as well as for the transport operators who can obtain economic rewards. The additional costs for procurement, installation and operation of public transport facilities which have been adapted to the needs of people with disabilities will often end up paying for themselves.

However, the wide palette of measures and technology available makes it essential to provide uniform advice to municipal authorities and transport operators on planning public transport to make it accessible to PRM. The deployment of low-floor buses which enable people with disabilities to board and disembark much more easily, or even at all, generally speeds up passenger turnover because there are no steps which have to be negotiated when getting on or off the bus. Stopping times at bus stops are shorter, the operational process is accelerated and the transport operator saves on vehicles and staff. Due to shorter waiting times, energy use is also reduced leading to a cleaner environment.

The installation of lifts to reach destinations which are not at ground level is nowadays a general convenience feature for service industries, e.g. office buildings, hotels and shops. A lift at train stations is now also an indispensable feature which ensures extra passengers for public transport who otherwise would travel by car or by taxi if they cannot climb stairs or can only do so with great difficulty.

Finally, passenger information is an essential and increasingly attractive component of the public transport services offered by operators. It includes visual and acoustic information systems which are essential for people with visual and hearing disabilities. Such systems are useful however for all passengers, in particular for infrequent users of the transport system, for strangers to the city and tourists.

Alternatives to adapting public transport systems to the needs of people with disabilities would be to either operate a separate dedicated transport service or (financially) subsidising the use of taxis and private passenger cars. Both alternatives have several disadvantages. Journeys with a dedicated transport service have to be booked in advance and so spontaneous journeys cannot be made, meaning unrestricted mobility is not possible. It also means people with disabilities are not integrated, but instead are excluded from the rest of society. In addition, separate dedicated services create such high costs that people with disabilities can only be offered a restricted number of journeys.

Taxis are only suitable for a relatively small number of people with severe disabilities. Most of the passenger cars used are only able to transport foldable wheelchairs, i.e. passengers with larger wheelchairs cannot use this system at all. Disabled people who have problems with their joints are often not able to lower themselves into a taxi. This would mean that a transport service exclusively using taxis would invariably exclude severely disabled people from using it.

6.1.4 Technical possibilities of implementation

The technology required to improve the situation for PRM is already available. In the last ten years there has been a rapid development in this area. Therefore, there is no need to wait any longer for public transport to be adapted to the needs of people with disabilities. There is a technical solution for every mobility problem affecting people with disabilities. Whether they are wheelchair users, visually impaired, audibly impaired or have another disability, the market offers ample technical aids for each and every case. However, there are suitable and unsuitable solutions. Assistance in
making decisions about the planning of an accessible transport system can therefore help avoid making unwise investments.

Many aids for people with disabilities are already the norm, for example in vehicles. Most bus manufacturers now only produce low-floor buses for inner city transport, which are additionally fitted with the kneeling system for transport companies. Two-thirds of all new buses are now delivered with mechanical ramps. These extra features generally only cost an additional 1–2% of the purchase price. These requirements for a modern urban bus system are also contained in the EU Directive 2001/85/EC, which specifies that from 2004 all new city buses brought into operation must be adapted to the needs of people with disabilities. The percentage of low-floor trams is also steadily rising and as with buses, encouragement should be provided to ensure that in future all new trams procured should be easily accessible low-floor models.

With regard to underground and suburban trains, two big problems have to be solved: on the one hand barrier-free access to all stations and on the other hand step-free boarding of vehicles. The accessibility of stations must be ensured by introducing lifts or, at the very least, ramps for all people with disabilities, even if this creates technical and financial problems – especially in the case of adding them to older or subterranean systems. Step-free boarding into the carriages should also be ensured, but can usually only be achieved when new vehicles are procured which have floors which exactly match the respective platform height.

6.2 Recommended individual measures

Within the framework of this study several possible measures for improving the accessibility of public transport for PRM have been documented. These are based on the information received from the cities surveyed concerning their solutions and planning, information received from vehicle manufacturers regarding latest technological developments in this field, the demands and needs of people with disabilities, as well as on the practical experience of the authors. Below are some essential recommendations for the practical implementation of a public transport system which is adapted to the needs of people with disabilities.

6.2.1 Stops and stations

With regard to underground and suburban trains, step-free accessibility of platforms is the most important demand. The most convenient option for underground and elevated stations is the construction of lifts. However, there could be technical problems adding lifts to existing and older facilities. If necessary, it is possible to use a combination of lifts, for example, from the pavement to the mezzanine floor and from here from a different point to the platform. If possible, the lift should have two doors facing each other so that the wheelchair user does not have to turn in the lift or manoeuvre out of the lift backwards. Alternatively, fixed ramps could be introduced, although, due to the low gradient required, a large surface area would be needed.

Step-free access to platforms in underground or suburban train systems must continue to be facilitated. It is important to ensure that the edge of the platform is secure enough so that people with visual impairments do not accidentally fall onto the tracks. This is achieved nowadays with grooved or knobbed slab elements before the edge of the platform. In addition, these elements should contrast sharply with the colour of the platform floor. They can also be used as orientation aids, for example, to guide passengers to lifts, to exits or to warn them of obstacles on the platform. For the benefit of passengers with visual impairments it is important to mark the start and end of stairways (first and last step) to make them more easily visible. In lifts, audible signals should also announce the respective floor level (street level, mezzanine floor, platform).
Doors and control buttons to open them should have a colour contrasting design so that they stand out. All operation buttons must be illuminated and be prominently displayed and not recessed to ensure that they can easily be found and operated by disabled people. All movement processes of technical features should continue to give acoustic signals, e.g. closing of the vehicle and lift doors.

Where tram systems with elevated platforms are in use, provisions must also be made for barrier-free access to the platform. The technical possibilities available correspond to the aforementioned for suburban and underground trains, if only to overcome small height differences.

A barrier-free bus system requires a special design of stops. The most important demand is the widening of pavements, whereby the bus can pull up closely enough to the kerb without being hindered by parked cars. This is the only way of avoiding too big a gap between the edge of the pavement and the vehicle, an obstacle which cannot be overcome by wheelchair users. Widened pavements can also be raised slightly to reduce the height difference when boarding.

In cases where the buses have to change lanes to reach the stop and pull into the parking lane, special attention should be paid to the enforcement of parking restrictions at bus stops. This is necessary to allow the bus to pull up closely enough to the kerb thus ensuring that people with disabilities can get on or off the bus without having to negotiate differences in height or gaps. Furthermore, the bus shelters should be well illuminated and protected, for instance by barriers, from passing traffic.

6.2.2 Vehicles

The main issue with regard to vehicles is to facilitate as far as possible step-free boarding and alighting. With buses this can be achieved through the use of low-floor buses with kneeling technology or lifts. Alternatives to kneeling for minimising the boarding height include ramps or a platform lift. In this case, there is no need for a minimum kerb height. These demands are included in the EU Directive 2001/85/EC and from 2004 must be taken into consideration in the EU Member States for the procurement of new vehicles. Nearly all transport companies and also vehicle manufacturers favour the middle door in buses for boarding for PRM. Therefore, mechanical ramps or platform lifts should be located here.

With an average bus life-span of 12-20 years, an end is in sight for the use of high-floor city buses with boarding steps. At present about 55 % of buses are low-floor – and if the current trend continues – the percentage of these vehicles will have risen to over 95% by the year 2010.

Just as in buses, step-free boarding and alighting should be facilitated for tram cars as far as possible. New vehicles manufactured today make this possible. The best solution is a vehicle in which the whole interior is completely (100 %) low-floor. This cannot always be realised due to constructional reasons (e.g. the height of the vehicle bogie). It would also suffice if part of the interior were low-floor (ideally: 70 %), or at least in the section where seats for mobility impaired passengers have been designated.

If not all the tram stops within the tram network have a platform, the vehicles must be additionally equipped with a mechanical ramp or a lift. This feature is necessary, in particular in old tram networks, where stops have no platform, i.e. the vehicle has to be boarded directly from the street.

As the life of tram vehicles is relatively long in comparison to buses, it could still take over 40 years in some cities for the tram fleet to be completely replaced by low-floor vehicles. In such cases it is possible, as a provisional solution, to introduce a low-floor section in the centre of articulated vehicles or to procure low-floor carriages to attach to high-floor rail cars.
The situation is different in tram systems with high platforms. Here there are no system-related height differences between the tram stop platform and the vehicle floor; however, it is necessary to ensure step-free accessibility of the raised platform. This can be achieved by means of lifts, jack-up lifts or ramps which facilitate access to the platforms.

Step-free boarding must also be made possible in underground and suburban trains. This should be achieved by adjusting the vehicle floor height to the height of the platform. If this is (still) not the case in older systems, a portable ramp should be available at all stations, which can be operated by the driver or station personnel whenever required to provide step-free boarding and alighting. It is important to ensure that the gap between the platform and vehicle is reduced so that there is no danger of the wheels of the wheelchair getting stuck.

It is necessary to introduce appropriate restraining or tie-down systems to secure wheelchairs in buses. The most common is the safety belt system which can only be effective if the wheelchair user and the wheelchair are not secured in the vehicle by the same belt, but instead by two separate ones. With this system, however, the wheelchair user generally requires assistance from others and, in addition, the safety procedure is awkward and time-consuming. The development by industry of a tie-down system which is simpler to operate is highly desirable.

The interior of the vehicles should also be adapted to meet the needs of blind and visually impaired people. The gangways should be step-free and handrails as well as corners and edges should be colour contrasted and clearly visible. At the stops, a tactile surface should guide the passenger from the pavement to the bus entrance. An acoustic information system for the announcement of stops and change options is just as essential in buses as is a visual display system for passengers with audible impairments.

### 6.2.3 Information systems

A differentiation must be made between static and dynamic information for people with disabilities. The former refers to the actual timetable service provided and includes for instance plans of the city, network plans or timetables with special information about lines and stations adapted to the needs of people with disabilities. Stations and lines accessible to wheelchair users should be specially indicated. It is also necessary to have appropriate signposting at stops or in stations pointing out the location of facilities which are accessible to people with disabilities. In general, attention should be paid to operation and service elements being positioned in the same place and having the same layout. Important information should also be available in Braille or in tactile map extracts for people with visual impairments.

Dynamic information shows the current status of services and therefore can differ from static information in that it, for example, provides information about service disruption. For instance, a station with a lift is not accessible to a person with a disability if the lift is out of order or if a replacement vehicle operated on a particular line is not adapted to the needs of people with disabilities. Temporary disruptions to routes or exits due to construction work are also particularly critical for PRM. All current information must also be available to PRM, at the very least via a telephone information hotline, because route planning for wheelchair users depends greatly on the functioning of services which are adapted to the needs of people with disabilities.

A totally different form of information is also important for a comfortable and safe transportation of PRM by urban public transport. The drivers and supervisory staff are responsible for the safety of passengers. Intensive staff training is needed in how to deal with people with disabilities, as many aids and handrails must be geared to the special needs of this group. Awareness training on the particular difficulties of people with disabilities should not be forgotten. Only 70% of transport operators have so far integrated training for drivers into their in-house training programmes.
6.2.4 Financing issues

Adapting a local public transport system to the needs of people with disabilities requires a certain level of investment. This can be minimised in the case of procuring new vehicles adapted to the needs of people with disabilities to replace other vehicles. In the case of stations, however, the investment is greater. Clear financial rules should be defined to ensure planning accuracy for the respective transport operators and the affected PRM. Financial subsidies by municipal authorities can help to offset the high initial investment costs.

One way of achieving this aim is to attach conditions to subsidies and grants for municipalities and transport operators. In this way it would be possible to ensure that subsidies would only be available for the construction of barrier-free systems and the procurement of accessible vehicles. Legally binding incentives could also be created for authorities and transport operators to consistently drive forward the barrier-free development of urban public transport systems.

In addition to the high investment costs, but on a much smaller scale, the operation costs for services designed to meet the needs of people with disabilities also need to be considered. At the same time, services which are adapted to the needs of people with disabilities also improve accessibility for other passengers, thus increasing efficiency and revenue for transport operators.

Where fare reductions have not already been implemented, reduced fares for people with disabilities should be introduced. This is the policy in most of the cities which took part in the survey. Apart from the clear social dimension, it is much cheaper for the municipality to transport people with disabilities by public transport than to operate a separate dedicated service.

6.2.5 Taking into consideration the needs of PRM

The importance of continued dialogue between all players in the field of public transport and PRM should not be underestimated. All problems and conflicts ranging from general planning, (e.g. the optimal sequence for adapting stations to the needs of people with disabilities), to the required features of new vehicles (e.g. decisions about ramps or jack-up lifts), to timetable requirements, can be solved in such a way to ensure full optimisation for people with disabilities and at the same time make sure that financial resources are used effectively.

The best way of ensuring joint planning efforts and exchanges of experiences is cooperation between transport authorities, transport operators and local government authorities. In its urban development plans and municipal transport strategies a city should define the needs of people with disabilities and make them binding in agreement with those affected. Thus, the participation of people with disabilities should be guaranteed at every stage of planning and policy implementation.

This does not only refer to the public transport sector. In order to enable unrestricted freedom of movement for PRM in their environment, it is important to understand and to ensure that in a barrier-free design all links in the closed transport chain are developed accordingly. This includes buildings, access routes, stops and transport modes.

All planning and practical implementation should finally be subjected to permanent control of project progress. This can be in the form of audits of the whole system. In addition, regular progress inspections are particularly important\(^\text{70}\). Especially in the context of current changes in public transport, characterised by a trend of opening up to competition, those responsible for awarding transport services have the possibility to greatly influence the realisation of a barrier-free public transport system and to constantly control this by means of relevant quality standards. A bonus-malus sys-

\(^{70}\) European Conference of Ministries of Transport: Improving Access to Public Transport
6.3 Broad recommendations

The development of a local public transport system which is adapted to the needs of people with disabilities should be an objective for all cities. This refers primarily to all new planned constructions of transport facilities, installations and vehicles and also to the rehabilitation and refurbishment of existing installations and facilities to adapt them to the needs of PRM. The technical possibilities for such measures are available and in some cases, for example in the bus sector, the new products offered by the industry are almost exclusively adapted to these needs. Deficiencies exist, though, as the aims are not legally embedded in the relevant laws and regulations of EU Member States.

However, the present situation in the EU cannot, as yet, be described as an ideal starting point for the implementation of such measures. There are no standard definitions and consequently there is a lack of comparable figures on the number of PRM. In particular, it is still necessary in many places to convey the opinion that introducing expensive measures to make transport systems accessible to PRM does not just bring benefits to a small minority of the population, but ultimately is a benefit for all citizens and for local public transport as a whole. All these aspects prove that there is a need for further political action and persuasion. The following recommendations are intended to assist this process.

6.3.1 Definition of PRM

There are divergent definitions in each EU Member State for the group of people with disabilities. This means that is a wide variation in the interpretation of PRM. A standard European definition would provide an impetus improving the mobility situation of this group of people.

The definition of people with disabilities differs greatly in the individual Member States. It depends partly on the financial support of the person, the degree of disability, restrictions in the ability to work or on age. The development of a standard catalogue of criteria seems necessary, which would enable comparative studies to be conducted and subsequent standard measures to be implemented in the most useful way.

If one wishes to initiate measures for a certain section of the population, in this case for PRM, it is necessary during the planning phase to clearly define the group and its demands and needs and to correctly forecast the extent of use. A standard procedure within the EU would also be advantageous in this case.

6.3.2 Standardisation of statistics

There is no accurate figure for the total number of PRM in Europe, nor are there precise estimates in the individual EU Member States. This is due, on the one hand to the absence of an appropriate definition as already mentioned above, and on the other to the lack of statistical data. Without concrete knowledge about the size and composition of the PRM group, no effective planning for the improvement of the living situation for this group of people can be implemented. For this reason the statistics of the EU Member States should be standardised and completed.

Many measures for PRM are dismissed with the argument that this target group is too small or there is no relation between the costs and benefits. If, however, one imagines that one in every four people has difficulties using public transportation, it is easier to make a decision regarding the appropriate conversion of public transport services. At the moment there is no comprehensive overview of the transport situation for PRM in the cities of the EU Member States. Here however lies the key to the promotion and support of necessary measures by the EU. Without appropriate sta-
tistical material it is not possible to identify starting points for the targeted improvement of the situation in the individual cities and regions. Further research is necessary to improve the data.

Out of the 77 cities which were approached during this study, and despite numerous reminders, only 32 cities could provide information about the services they offered for people with disabilities and their use. Therefore, useful comparisons and conclusions have only been possible to a limited extent. In order to develop practical recommendations and to enable a targeted exchange of experiences this database should be extended. Nothing is as inexpensive as benefiting from the experiences of others.

The Accession Candidates which will soon join the EU should also be considered early enough. It can be assumed that the current situation in those countries regarding accessibility to public transport by PRM is worse than in the EU, although, the necessary overview is not available to make a detailed assessment. There is a great need to act and the dimensions should be outlined early enough, as experience shows that the practical implementation of the relevant measures requires a long time to be realised.

6.3.3 Economic benefits

A public urban transport system which is designed to meet the needs of people with disabilities also leads to cost savings for municipalities and communities even if financial assistance for additional investment and operation costs is required. On the one hand, facilitating mobility for people with disabilities is advantageous from the economic point of view and on the other hand, using the general public transport system for the transportation of people with disabilities is much cheaper than using specially tailored solutions.

Very often, the availability of an adapted transport service for people with disabilities can make a significant difference when commuting to work. They are then able to provide for themselves and are not dependent on state support. Their contribution to the economic activity of a region should also not be overlooked.

If an accessible public transport system is available, people with disabilities are also able to take care of their own personal needs; the expensive assistance of a third party can be dispensed with. So, for example, expensive home help for people with serious disabilities may become unnecessary if these people are able to use public transport to visit out-patient facilities.

So far the only means of transportation for people with disabilities consists of special, cost intensive transport services. If an accessible transport system is available, the operation of such dedicated services is only necessary in some cases (e.g. for people with severe disabilities). The existence of an accessible public transport service provides PRM with more flexibility, allowing them the freedom of spontaneity instead of making plans far in advance.

6.3.4 Legislative and regulatory needs

The obligations and regulations for an accessible development of public transport are anchored in different ways and to varying degrees in the appropriate laws and regulations of the individual EU Member States. Both the number of legally defined requirements as well as the way in which requirements are defined vary from one Member State to the other. A uniform framework which provides detailed guidelines on the planning of an accessible public transport system would represent a useful starting point.

71 European Conference of Ministries of Transport: Transport for People with Mobility Handicaps – Policy and Achievements in Europe
Decisions about the extension or rehabilitation of the public transport system in cities and communities are still often made without adequately taking into consideration the needs of PRM. If not already available, legal and administrative conditions should be introduced which require authorities and transport operators to completely account for the needs of PRM in their further planning.

From the point of view of the user it would be an advantage if at least the principles for accessibility measures were standardised across the EU. This would provide people with disabilities who travel to other cities and regions with the same or at least comparable features and aids. This is important not only from the aspect of creating the same living conditions across the EU, but also from the point of view that more and more people with disabilities are travelling as tourists. For example, a standard tactile aid for blind and visually impaired people is important to facilitate mobility without difficulty in other towns.

6.3.5 Communication at local and regional level

The status concerning equipment and adaptation of facilities and vehicles for PRM varies widely from one city to another, even within the same country. This is not only due to the amount of financial means available, but also results from a lack of awareness of the problem and lack of information among those who are responsible locally. The level of information should be raised by means of appropriate information material and awareness campaigns in order to make the local authorities more sensitive to the needs of PRM.

The knowledge among planning engineers and decision-makers in the transport sector about the needs of PRM is in some cases still very rudimentary and so quite often sheer ignorance or thoughtlessness can lead to planning flaws. Guidelines, case studies, and checklists could help avoid unnecessary errors in planning and implementation stages. The accessibility of facilities and vehicles for PRM must become more deeply embedded in the minds of political decision-makers, administrations, and transport operators.

Apart from an improvement in general information, more work should be done towards actively involving disabled associations and organisations in the planning and decision-making with regard to the improvement of the transport situation for PRM. It is precisely this group of people who have the practical experience to make recommendations and suggestions on how to make local public transport more accessible.
## Annex I – Organisations consulted during the study

<table>
<thead>
<tr>
<th>No.</th>
<th>Organisation</th>
<th>Name</th>
<th>Country</th>
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<tr>
<td>1</td>
<td>European Conference of Ministers of Transport</td>
<td>Jack Short</td>
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<td>2</td>
<td>European Disability Forum (EDF)</td>
<td>Sophie Beaumont</td>
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<td>3</td>
<td>European Older People’s Platform (AGE)</td>
<td>Catherine Daurele</td>
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<td>4</td>
<td>European Blind Union (EBU) – Commission on Mobility and Guide Dogs</td>
<td>Jill Allen King</td>
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<td>1</td>
<td>Bundesministerium für Verkehr, Innovation und Technologie</td>
<td>Stefan Mayerhofer</td>
<td>Austria</td>
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<td>2</td>
<td>Bundesministerium für soziale Sicherheit und Generationen</td>
<td>Dr. Max Rubisch</td>
<td>Austria</td>
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<td>3</td>
<td>Ministerie van het Brussels Hoofdstedelijk Gewest</td>
<td>John Baert /</td>
<td>Belgium</td>
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<td></td>
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<td>Sabine Rousseau</td>
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<td>4</td>
<td>Ministère des Communications et de l'Infrastructure</td>
<td>Jean-Pierre Guissard</td>
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<td>5</td>
<td>Trafikministeriet</td>
<td>Karoline Lolk /</td>
<td>Denmark</td>
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<td></td>
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<td>Kaspar Brandt</td>
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<td>6</td>
<td>Sundheds- / Indenrigsinisteriet</td>
<td>Lene Christensen</td>
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<td>Sosiala- ja Terveysministeriö</td>
<td>Aini Kimpimäki</td>
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<td>8</td>
<td>Sosiala- ja Terveysalan Tutkimus- ja Kehittämiskeskus (Stakes)</td>
<td>Aulikki Rautavaara</td>
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<td>Liikenne- ja Viestintäministeriö</td>
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<td>10</td>
<td>Ministère de l’équipement, des transports et du logement</td>
<td>Catherine Bachelier /</td>
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<td></td>
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<td>Christine Deja /</td>
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<td>Hasni Jeridi</td>
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<td>11</td>
<td>Ministère de l’emploi et de la solidarité</td>
<td>Jean-Yves Hoquet /</td>
<td>France</td>
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<td></td>
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<td>Carsten Spreiter</td>
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<td>Bundesministerium des Inneren</td>
<td>Thomas Biermann</td>
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<td>Reinhold Zahn</td>
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<td>Department of Social, Community and Family Affairs</td>
<td>Aida Outeiro</td>
<td>Ireland</td>
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<td>Department of Public Enterprise, Public Transport</td>
<td>Ed O’Callaghan</td>
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<td>Ministero del Lavoro e delle Politiche Sociali</td>
<td>Dott. Paola Chiari /</td>
<td>Italy</td>
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<td></td>
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<td>Fertitta Gabriele</td>
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<td>18</td>
<td>Ministero delle Infrastrutture e dei Trasporti</td>
<td>Dott. Antonio Erario</td>
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<td>19</td>
<td>Ministère des Transports</td>
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<td>Ministério da Saúde</td>
<td>J. Alexandre Diniz</td>
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<td>22</td>
<td>Ministério do Equipamento Social</td>
<td>Lina Maria Pereira</td>
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<td>Ministerio de Trabajo y Asuntos Sociales</td>
<td>Jesús Diaz Pereira</td>
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<td>Socialdepartementet</td>
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<td>Näringsdepartementet</td>
<td>Annika Olsson</td>
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<td>26</td>
<td>Department of Environment, Transport and the Regions</td>
<td>Ann Frye / Sue Sharp</td>
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<td>Union Belge des Transports en Commun Urbains et Régionaux</td>
<td>René Schoofs</td>
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<td>2</td>
<td>Amtsrädsforeningen</td>
<td>Jesper Kervin Petersen /</td>
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<td>Henrik Severin Hansen</td>
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<td>Union des Transports publics</td>
<td>Valérie Beaudouin /</td>
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<td>Anne Meyer/</td>
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<td>Verband Deutscher Verkehrsunternehmen</td>
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<td>Svenska Lokaltrafikföreningen</td>
<td>Björn Sundvall</td>
<td>Sweden</td>
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<td>6</td>
<td>Rikstrafiken (The National Public Transport Agency)</td>
<td>Gunilla Bergmann</td>
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## National Disabled Associations

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<td>Österreichische Arbeitsgemeinschaft für Rehabilitation</td>
<td>Dr. Anthony Williams</td>
<td>Austria</td>
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<td>2.</td>
<td>Vlaams Fonds voor Sociale Integratie van Personen met een Handicap</td>
<td>Rudi Kennes</td>
<td>Belgium</td>
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<td>3.</td>
<td>De Gilde van de voetganger en gelijkgestelde rolstoelgebruiker</td>
<td>Xavier de Cremer</td>
<td>Belgium</td>
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<tr>
<td>4.</td>
<td>Toegankelijkheidsbureau Hasselt</td>
<td>Annelies Vogelaers</td>
<td>Belgium</td>
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<tr>
<td>5.</td>
<td>De Samvirkende Invalideorganisationer</td>
<td>Ole Henriksen</td>
<td>Denmark</td>
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<td>6.</td>
<td>Sozialverband V. d. K. Deutschland e. V.</td>
<td>Dr. Volker Sieger</td>
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<td>7.</td>
<td>People with disabilities in Ireland Ltd. (PWDI)</td>
<td>Sharyn Long</td>
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<td>8.</td>
<td>Centre National d'Information et de Rencontre du Handicap</td>
<td>Sylviane Jeanty</td>
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<td>Confederação Nacional dos Organismos de Deficientes</td>
<td>Henrique Mendonça</td>
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<td>Comité Espanol de Representantes de Minusválidos (CERMI)</td>
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<td>11.</td>
<td>Handikappförbundens samarbetsorgan (HSO)</td>
<td>Roger Marklund</td>
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<td>Swedish National Road Administration</td>
<td>Einar Tutvesson</td>
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<td>Royal National Institute of the Blind (RNIB)</td>
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<td>14.</td>
<td>UK Representative to the European Disability Forum</td>
<td>Bill Campbell</td>
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## Municipal Transport Administrations

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<td>1.</td>
<td>Linz Linien</td>
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<td>City Council Helsinki</td>
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<td>Mairie de Toulouse, Relations Internationales et Affaires Européennes</td>
<td>Alain Vaysse / Inas de Brion</td>
<td>France</td>
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<td>Rennes Métropole, Service des Transports Urbains</td>
<td>Nella Gentilhomme Laurent</td>
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<td>Land Berlin, Senatsverwaltung für Stadtentwicklung</td>
<td>Rolf-Manfred Jacob</td>
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<td>Landeshauptstadt Dresden, Kommunale Statistikstelle</td>
<td>Claudine Kaul / Christian Steinmann / Uwe Krollik</td>
<td>Germany</td>
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<td>Stadt Frankfurt am Main, Lokale Nahverkehrsgesellschaft</td>
<td>Walter Helfert / B. Wilde</td>
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<td>Stadt Freiburg im Breisgau, Tieflbauamt</td>
<td>Uwe Schade</td>
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<td>Jochen Allgeier</td>
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<td>Uwe Högemann</td>
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<td>Freie Hansestadt Bremen / Senator für Bau und Umwelt</td>
<td>Wilhelm Hamburger</td>
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<td>Landeshauptstadt München / Büro des Oberbürgermeisters</td>
<td>Cornelius Mager</td>
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<td>Câmara Municipal do Porto</td>
<td>Dr. Ana Luisa Coutinho/ Dr. Luis Mesquita</td>
<td>Portugal</td>
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<td>20.</td>
<td>Servicios Municipalizados de Transportes Urbanos de Coimbra</td>
<td>António Santo Alvesda Cuha</td>
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<td>21.</td>
<td>Centro de asesoramiento para la discapacidad Sevilla</td>
<td>Manuel Jiménez Hernández</td>
<td>Spain</td>
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<td>22.</td>
<td>Mercytravel</td>
<td>Andrew Dale / David Finnegan</td>
<td>United Kingdom</td>
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### Annex I

#### Municipal Disabled Associations

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<td>1.</td>
<td>Stadtmagistrat Innsbruck</td>
<td>Martin Baltes / Dietmar Graff</td>
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<td>Sepp Schmidt</td>
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<td>3.</td>
<td>Selbstbestimmt Leben Initiative Linz (SLI)</td>
<td>Klaudia Karoliny</td>
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<td>4.</td>
<td>Stad Gent, Schepen van Sociale Zaken, Huisvesting en Emancipatie</td>
<td>Martine De Regge / Annick De Langhe</td>
<td>Belgium</td>
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<td>5.</td>
<td>Helsingin Invalidien Yhdistys</td>
<td>Mina Mostahedi</td>
<td>Finland</td>
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<td>Sirku Kivvinitty</td>
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<td>Collectif Départemental des Associations des Personnes Handicapées et de leur Famille Rennes</td>
<td>Arnauld Baltazar / Michel Lozachmeur</td>
<td>France</td>
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<td>8.</td>
<td>Städtischer Beraterkreis Behinderte der Stadt München, Facharbeitskreis Mobilität</td>
<td>Carola Walla</td>
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<td>9.</td>
<td>Disabled Association of Thessaloniki</td>
<td>Anastasia Vrahnou</td>
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<td>The Country Council of the City and Country of Cardiff</td>
<td>John Gibson</td>
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#### Urban Transport Operators

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<td>1.</td>
<td>Innsbrucker Verkehrsbetriebe / Stubaitalbahn</td>
<td>Harald Jösslin</td>
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<td>Wiener Linien</td>
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<td>Thierry Villers</td>
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<td>Århus Sporvej</td>
<td>Anna Marie Mikkelsen</td>
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<td>Hovedstadens Udviklingsråd / Greater Copenhagen Authority</td>
<td>Birger Nielsen</td>
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<td>Huvudstadsregionens Samarbetsdelegation YTV</td>
<td>Antti Vuorela</td>
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<td>Helsingin kaupungin liikennelaitos HKL</td>
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<td>Régie des Transports de Marseille</td>
<td>Jürgen Senst</td>
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<td>Berliner Verkehrsbetriebe</td>
<td>Andreas Hesse / Volker Arndt</td>
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<td>Bremer Straßenbahn AG</td>
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<td>Bus Átha Cliath (Dublin Bus) / Business Development Executive</td>
<td>Gareth Quinn</td>
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<td>Ketti Saggiorato / Valerio Miranti</td>
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<td>Greater Manchester Passenger Transport Executive</td>
<td>Marcia Bromley / Keith Howcroft</td>
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<td>26.</td>
<td>Glasgow City Council / Development &amp; Regeneration Services</td>
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<td>1.</td>
<td>NEOPLAN Bus GmbH</td>
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<td>SIEMENS AG Transportation Systems</td>
<td>Oliver Schmidt</td>
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  Helsinki 2001

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  Spring 2002
Annex III – Legislation

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1. European Union


1.1.1 Vehicles

1.1.1.1 Buses

Requirements concerning:

Steps (Annex I, paragraph 7.7.7. and Annexe VII, paragraph 3.1.) – maximum and minimum height with the kneeling system not activated, minimum depth and maximum slope and width and shape of steps for passengers at service and emergency doors. All steps shall have a slip-resistant surface.

Priority seats and space for passengers with reduced mobility (Annexe VII, paragraph 3.2.) – “A minimum number of forward or rearward facing seats for disabled passengers shall be situated in a position near to a service door(s) suitable for boarding and alighting. The minimum number of priority seats shall be four in Class I 2, two in Class II 3 and Class III 4 and one in Class A 5 and B 6.”

There are requirements regarding the armrests, the handrails and handholds to facilitate entry and exit of the seat, and the measures of these spaces and of priority seats. These spaces shall also present adequate space for a guide dog.

Communication devices (Annexe VII, paragraph 3.3.) – they shall be placed adjacent to any priority seat and within any wheelchair area. Requirements concerning the measures and its operation and these devices shall be in a contrasting colour or colours and tone.

Pictograms (Annexe VII, paragraph 3.4.) – “vehicles fitted with a wheelchair space and/or priority seats shall have pictograms (...) visible from outside, both on the front nearside of the vehicle and adjacent to the relevant service door(s). Appropriate

---

1 “Member States shall be free to choose the most appropriate solution to achieve improved accessibility in vehicles other than those of Class I. However, if vehicles other than those of Class I are equipped with devices for people with reduced mobility and/or wheelchair users, they shall comply with the relevant requirements of Annexe VII.” (Article 3) Vehicles of Class I are those “having capacity exceeding 22 passengers and constructed with areas for standing passengers, to allow frequent passenger movement.” (Annexe I, paragraph 2.1.1.1.) Annexe VII regards the Requirements for Technical Devices Facilitating Access for Passengers with Reduced Mobility.

2 Vehicles having a capacity exceeding 22 passengers and constructed with areas for standing passengers, to allow frequent passenger movement. (Annexe I, paragraph 2.1.1.1.)

3 Vehicles constructed principally for the carriage of seated passengers, and designed to allow the carriage of standing passengers in the gangway and/or in an area which does not exceed the space provided for two double seats. (Annexe I, paragraph 2.1.1.2.)

4 Vehicles constructed exclusively for the carriage of seated passengers. (Annexe I, paragraph 2.1.1.3.)

5 Vehicles designed to carry standing passengers; a vehicle of this Class has seats and shall have provision for standing passengers. (Annexe I, 2.1.2.1.)

6 Vehicles not designed to carry standing passengers; a vehicle of this Class has no provision for standing passengers. (Annexe I, 2.1.2.2.)
ate pictograms shall also be placed internally adjacent to the wheelchair space or the priority seat.”

Floor slope (Annexe VII, paragraph 3.5) – “The slope of a gangway, access passage or floor area between any priority seat or wheelchair space and at least one entrance and one exit or a combined entrance and exit shall not exceed 8%. Such sloping areas shall be provided with a non-slip surface.

Wheelchair accommodation provisions (Annexe VII, paragraph 3.6.) – measures regarding a special area in the passenger compartment for wheelchair users. To have access to these areas there shall be at least one doorway through which wheelchair users can pass (in the case of a vehicle of Class I, at least one wheelchair access door shall be a service door).

Seats in the wheelchair space (Annexe VII, paragraph 3.7.) – folding and demountable seats may be fitted in a wheelchair space. However, such seats when out of use shall not intrude into the wheelchair space and the second ones shall be easily removed by the driver or a crew member. Seats which intrude into a wheelchair space shall have a sign fixed on or adjacent to them with the text: “Please give up this space for a wheelchair user”.

Stability of wheelchairs (Annexe VII, paragraph 3.8.) – “the wheelchair space shall be fitted with a restraint system in order to warrant the stability of the wheelchair”. Any restrained system shall be capable of being easily released in the case of an emergency and be securely attached to vehicle anchorages. Its operating instructions shall be clearly displayed.

The dynamic test requirements for those systems are described.

“The wheelchair space shall be designed for the wheelchair user to travel unrestrained with the wheelchair facing rearwards against a support or a backrest”.

Door controls (Annexe VII, paragraph 3.9.) – maximum height of an opening control adjacent to a wheelchair access door.

Lighting (Annexe VII, paragraph 3.10.) – “Adequate lighting shall be provided to illuminate the area inside and immediately outside the vehicle to allow people with reduced mobility to board and alight in safety.”

Boarding aids (Annexe VII, paragraph 3.11.) – requirements and regarding the kneeling system, lifts (power operated and manual operated lifts) and ramps (power operated and manually operated lifts) and its measures and modes of operation. These boarding aids shall be incapable of operation in case of failure of the safety device, unless they can be safely operated by manual effort.

Articulated section of articulated vehicles (Annexe I, paragraph 7.9.) – maximum difference in level between the floor of the rigid portions and the floor of the rotating base (20 mm when all the wheels of the vehicle are on the same plane or 30 mm when the wheels of the axle adjacent to the articulated section are resting on a surface which is 150 mm higher than the surface on which the wheels of the other axles are resting).

Handrails and Handholds (Annexe I, paragraph 7.11.) – measures of handrails and handholds. The surfaces of them shall be colour contrasting and slip-resistant.
1.2 Directive of the European Parliament and of the Council


1.2.1 Vehicles

1.2.1.1 Rail

2. Austria

2.1 Federal law on the ordinance of local and regional public transport

<table>
<thead>
<tr>
<th>State</th>
<th>Law</th>
<th>NR.</th>
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<tbody>
<tr>
<td>Austria</td>
<td>Federal law on the ordinance of local and regional public transport</td>
<td>GP XX IA 1132/A AB 2046 S. 180. BR: AB 6046 S. 657.</td>
<td>23 December 1999</td>
</tr>
</tbody>
</table>

2.1.1 Costs / Financing

One of the conditions for the provision of federal funds is the accessibility of the systems, taking into consideration the needs of persons who are physically impaired in their mobility. (Article 31)

If the measures mentioned in Article 31 of the present law are not observed by the transport organisations, the payments for the dependent organisations are proportionally reduced. (Article 21)

These federal funds are available to pay for transport services of enterprises which operate exclusively for urban and suburban traffic. (Article 24)

2.1.1.1 Transportation costs

For special tariffs to be granted for certain groups of travellers the necessary means are to be fulfilled by the institution which requests such special tariffs. (Article 30)
3. Belgium

3.1 Law relating to the access of disabled persons to public buildings

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<tr>
<th>State</th>
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<tbody>
<tr>
<td>Belgium</td>
<td>Law relating to the access of disabled persons to public buildings⁷</td>
<td>---</td>
<td>17 July 1975</td>
</tr>
</tbody>
</table>

* Remarks (Buildings)

Public buildings should be accessible to persons with disabilities (it also applies to those undergoing significant transformation). (Articles 1 and 2)

Buildings accessible to the public which are used by persons with disabilities without the assistance of a third person must be sign-posted using the international symbol of accessibility. (Article 4)

⁷ Legislation in force in the Brussels, Walloon and Flemish regions.
4. Denmark

4.1 Act on Public Passenger Transportation for Local and Regional Passengers

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<tr>
<th>State</th>
<th>Law</th>
<th>NR.</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>Act on Public Passenger Transportation for Local and Regional Passengers</td>
<td>292</td>
<td>29 April 1992</td>
</tr>
</tbody>
</table>

4.1.1 Transport services provided

4.1.1.1 Special dedicated services

Each county council outside the area of the Capital shall set up a disabled transport system for people with severe physical disabilities in order to provide transport for treatment, therapy and the like. The transport arrangement must contain a minimum number of tours and the price must not be considerably higher than the price for the transport of persons without disabilities. The arrangement must also open the possibility of transport beyond the county borders. (Article 1)

* Remarks (Individual Transport)

Each county council outside the area of the Capital shall draw up a plan for individual disabled transport for persons with severe physical disabilities in co-operation with the disabled organisations. (Article 1)
4.2 Act on Public Passenger Transportation within the Greater Copenhagen Area

<table>
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<tr>
<th>State</th>
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<th>From</th>
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</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>Act on Public Passenger Transportation within the Greater Copenhagen Area</td>
<td>293</td>
<td>29 April 1992</td>
</tr>
</tbody>
</table>

*Remarks* (Individual Transport)
Transport companies have an obligation to provide individual transportation for persons with severe physical disabilities for trips in addition to those for treatment or therapy. (Article 1)
5. Finland

5.1 Act on Passenger Transport

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<tr>
<th>State</th>
<th>Law</th>
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<th>From</th>
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</thead>
<tbody>
<tr>
<td>Finland</td>
<td>Act on Passenger Transport</td>
<td>662/94</td>
<td>15 July 1994</td>
</tr>
</tbody>
</table>

5.1.1 Transport services provided

5.1.1.1 Special dedicated services

“The municipality has the task, when necessary, to define the level of services for public transport in its area. Municipalities must co-operate with each other in order to harmonise the services of the various modes of passenger transport as well as to consider the needs of various population groups, such as children, the elderly and people with disabilities.” (Section 3)
5.2 Act on Services and Assistance for Disabled People

<table>
<thead>
<tr>
<th>State</th>
<th>Law</th>
<th>NR.</th>
<th>From</th>
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</thead>
<tbody>
<tr>
<td>Finland</td>
<td>Act on Services and Assistance for Disabled People</td>
<td>380/87</td>
<td>3 April 1987</td>
</tr>
</tbody>
</table>

5.2.1 Costs / Financing

5.2.1.1 Transportation costs

“The municipality shall provide severely disabled persons with reasonable transport and related escort services, interpretation services and service accommodation if, because of his disability or illness, he needs assistance in order to manage his everyday affairs.” (Section 8)

“Regardless of the stipulations of section 16, paragraph 1 of said Act, State aid shall be paid towards the costs of providing the services stated in section 8, paragraph 2 (...) of the present Act.” (Section 5)

“A charge may be made for the transport service as stipulated in greater detail by Decree.” (Section 14)

* Remarks (Individual Transport)

“In order to improve the conditions of disabled persons the municipality shall co-operate with various authorities, institutions, organisations for people with disabilities and other such bodies whose activities are closely connected with the living conditions of disabled persons.” (Section 12)

“The Municipal Board may appoint a council for the disabled, the task of which shall be to pursue and promote activities in the different sectors of the municipal administration with reference to disabled persons. This council for the disabled may make initiatives and proposals and issue statements on matters of significance in the life and performance of disabled persons.” (Section 13)

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8 Act on the Planning of State Aid for Social Welfare and Health Services (677/82)
5.3 Decree on Support and Assistance for Disabled People

<table>
<thead>
<tr>
<th>State</th>
<th>Law</th>
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<th>From</th>
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<tbody>
<tr>
<td>Finland</td>
<td>Decree on Support and Assistance</td>
<td>759/87</td>
<td>18 September 1987</td>
</tr>
</tbody>
</table>

5.3.1 Transport services provided

5.3.1.1 Special dedicated services

"Transport services and related escort services shall include transport needed by a severely disabled person \(^9\) for work, studies, errands, social participation, recreation or other purposes pertaining to daily life \(^{10}\)." (Article 4)

"The municipality may arrange transport services (...\(^{11}\)) or compensate the reasonable costs for transport by taxi, invalid taxi or any other corresponding vehicle to a person \(^{12}\)." (Article 4)

Transport services shall be arranged for persons considered severely disabled "so that the person concerned is able to undertake at least eighteen one-way journeys each month pertaining to his daily life, in addition to the travel necessary for work or studies." (Section 6)

Remarks (Buildings)

"The municipality shall prevent and eliminate obstacles and disadvantages restricting the functional possibilities of disabled persons in order for them to function as equal members of society. The services and support measures needed by disabled persons shall be arranged so that these measures support the self-sufficiency of disabled persons in their daily lives." (Section 1)

---

\(^9\) "In the arrangement of transport services and related escort services, a person shall be considered severely disabled if he has special difficulties in moving and owing to his disability or illness, he cannot use public transport without unreasonable difficulty." (Section 5).

\(^{10}\) "Transport pertaining to daily life refers to transport within the municipality of residence of a severely disabled person or to municipalities in the immediate vicinity." (Article 4).

\(^{11}\) Referred to in section 3 of the Planning and State Subsidies for Social Welfare and Health Act (677/82).

\(^{12}\) Referred to in section 5 of the Planning and State Subsidies for Social Welfare and Health Act (677/82).
6. **France**

6.1 **Orientation in favour of disabled people**

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<tr>
<th>State</th>
<th>Law</th>
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<tbody>
<tr>
<td>France</td>
<td>Orientation in favour of disabled people</td>
<td>75-534</td>
<td>30 June 1975</td>
</tr>
</tbody>
</table>

6.1.1 **Vehicles**

Regulated ordinances to adapt public transport services in order to set the standards of vehicle construction as well as the conditions of accessibility to their vehicles or to facilitate the creation of special services. (Article 52)

* **Remarks** *(Buildings)*

"The architectural ordinances and the installations of residential buildings and of areas open to the public, in particular school areas, universities and educational areas, should be such as these buildings and installations are accessible to disabled persons". (Article 49)

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13 This law is from now on integrated in the family code and is currently under revision.
6.2 Internal Transport Orientation Act

<table>
<thead>
<tr>
<th>State</th>
<th>Law</th>
<th>NR.</th>
<th>From</th>
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</thead>
<tbody>
<tr>
<td>France</td>
<td>Internal Transport Orientation Act</td>
<td>82-1153</td>
<td>30 December 1982</td>
</tr>
</tbody>
</table>

6.2.1 Transport services provided
The underprivileged social categories, in particular those in insular parts, remote areas or with difficult access to their own territory, can be the subject of provisions adapted to their situation. (Article 2)

6.2.2 Information systems

6.2.2.1 Service
The right to transport includes the right of the users to be informed about the means which are offered to them and the methods for their use. (Article 2)

6.2.3 Costs / Financing

6.2.3.1 Transportation costs
Mobility right of accessibility, quality and price for all, under reasonable conditions as well as costs for the community, in particular for the use of means of transport open to the public. (Article 2)
6.3 Law relating to solidarity and urban renewal

<table>
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<tr>
<th>State</th>
<th>Law</th>
<th>NR.</th>
<th>From</th>
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</thead>
<tbody>
<tr>
<td>France</td>
<td>Law relating to solidarity and urban renewal</td>
<td>2000-1208</td>
<td>13 December 2000</td>
</tr>
</tbody>
</table>

6.3.1 Costs / Financing

6.3.1.1 Transportation costs

In the area of competence of authorities organising urban transport, people whose resources are equal or lower than what is fixed in article L 861-1 of the social error correcting code, benefit from passes entitling them to use transport services with a reduction of at least 50 %. (Section 4 – Article 123)

* Remarks (Public areas)

The rehabilitation of public areas in the urban environment must be such that they are accessible to people with disabilities. (Articles 35, 50, 55, 140, 154, 185)
6.4 Decree 78-1296

<table>
<thead>
<tr>
<th>State</th>
<th>Decree</th>
<th>NR.</th>
<th>From</th>
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</thead>
<tbody>
<tr>
<td>France</td>
<td>Code of Construction and Dwelling</td>
<td>78-1296</td>
<td>21 December 1978</td>
</tr>
</tbody>
</table>

6.4.1 Infrastructures

An elevator which can be practically used by people with reduced mobility must have an entry door with a minimum passage width of 0.80 m. The interior dimensions between linings of the cabin must be at least 1 metre (parallel to the door) × 1.30 metre (perpendicular to the door). The device controls located on the side of the cabin must have a maximum height of 1.30 m. The stop precision must have a maximum 2 cm. (Article 3)

The various control devices and services usable by the public must have a maximum height of 1.30 m above ground level and a minimum height of 0.40 m. (Article 7)

There are some recommendations concerning elevators, stairs and telephones (appendix).

6.4.2 Information systems

6.4.2.1 Signs

Generally, signs useful to the public have to be written in sufficiently large letters with contrasting colours and visible to visually impaired persons. Detailed attention is given to the existence of both an audible alarm and light signal. (appendix)

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14 It fixes the technical provisions intended to make accessible to people with disabilities, public establishments and installations during their construction, their creation or their modification, taken pursuant to article R.111-19-1 of the Code of Construction and Dwelling.
6.5 Decree fixing the measures intended to make public installations open

<table>
<thead>
<tr>
<th>State</th>
<th>Decree</th>
<th>NR.</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Decree fixing the measures intended to make public installations open to people with reduced mobility and to adapt public transport services to facilitate transport of disabled people</td>
<td>78-1167</td>
<td>9 December 1978</td>
</tr>
</tbody>
</table>

6.5.1 Vehicles
To improve the accessibility of regular public transport services to disabled people through the type of service and by removing constraints on exploitation which are not incompatible with the nature of the disability or by placing a transport system at the disposal of persons with disabilities which meets their needs.
These measures can concern:
The installation and the equipment of the access installations to the vehicles;
Equipping existing vehicles or the introduction of adapted vehicles;
The creation or the development of specially adapted services. (Article 17)

6.5.2 Infrastructures
Elevators: for the existing elevators, a door width of 0.70 m and interior dimensions of the cabin of 1.25 m x 0.95 m are tolerated. Staircases: a width of staircase of 1.20 m is tolerated, a width of 0.80 m is tolerated for a rectilinear flight of stairs.

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15 It is not clear if this is applied only to buildings or if it is also applied to public transport installations.
### 6.6 Implementation of the plans of urban transport and public transport

<table>
<thead>
<tr>
<th>State</th>
<th>Circular</th>
<th>NR.</th>
<th>From</th>
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<tbody>
<tr>
<td>France</td>
<td>Circular relating to State aid for the implementation of the plans of urban transport and public transport in the province</td>
<td>Circular Nr. 2001-51</td>
<td>10 July 2001</td>
</tr>
</tbody>
</table>

### 6.6.1 Costs / Financing

#### 6.6.1.1 Capital outlays

The following are subsidised by the State:
- Investments for the realisation of public transport projects in exclusive right of way (infrastructures, operating system and rolling stock) as well as accompanying investments (park-relay, pole of exchange) or the setting of standards regarding the security and accessibility of people with reduced mobility.
- Rolling stock which respects European norms and is accessible for people with reduced mobility.
- Special services for people with reduced mobility (the procurement of vehicles destined for special services for people with reduced mobility can be subsidised – maximum of 35%).
7. Germany

7.1 Social Code - ninth book

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<th>State</th>
<th>Law</th>
<th>NR.</th>
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7.1.1 Costs / Financing

7.1.1.1 Transportation costs

With regard to severely disabled people, upon the request of disabled persons, the authorities responsible for the execution of the Federal Law on Accompanying War Victims determines the existence of a disability and its degree in order to issue an identification document according to documentary evidence which shall have a valid stamp costing 5 Euro per month. (Paragraph 69)

Severely disabled persons who, due to their disability are mobility or audibly impaired, are entitled to free transport from the public transport operators upon presentation of the identification document. However, the document does not cover supplements where these must be paid. The same applies to (Paragraph 145):

- Escort of a severely mobility impaired person, if a constant escort is necessary and registered in the identification document
- The hand luggage of a person in a wheelchair, as far as the means of transport permits this; other orthopaedic aids and a guide dog.

Proof of severe impairment can be noted with a stamp on the identification document, a printed half lateral orange surface, in case the validity begins at the earliest on 1 April 1984 or in case an appropriate change note has been registered. (Paragraph 146)

The transportation cost losses of the public transport operators are refunded by a percentage of the incoming costs, proven by and refunded upon the request of the transport operators. (Paragraph 148)

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16 Changed by the Law about the Equality for Disabled Persons and the alteration of other laws. Disabled people or people prone to disability are provided with services according to the Code of Social Law IX in order to guarantee their self-determination and equality in society. For a disabled person to take advantage of the assistance he requires due to a disability, it is in principle not necessary for a certain “disability degree” to be established and for special documentation to be issued. Only some services to overcome disadvantages as a result of disability require the degree of disability to be established, for example, for free travel on local public transport. “Free travel” is provided for severely disabled people who are helpless or whose mobility in street traffic is considerably impaired. This applies also to blind and deaf people.

17 The federation carries the costs for free transport. Personnel and neutral administrative expenses are not refunded. (Paragraph 151)

18 Constant escort is necessary in case a severely disabled person is dependent on assistance when using public transport due to their disability, in order to avoid risks to his person or to other passengers. The costs for free transport are covered by the federation. (Paragraph 151). The annual revenue from the purchase of the stamps for the identification documents is to be paid to the federation. A federally uniform portion of the remaining revenue of each year from the Federal Ministry of Work and Social Affairs in agreement with the Federal Ministry of Finances and the Federal Ministry for Transport, Building and Housing shall be known. (Paragraph 152)

19 The revenue is all yields from ticket sales and also from the transport of hand luggage, wheelchairs, orthopaedic aids, animals as well as from supplements. If public transport is extended to an area of more than one federal state, the authorities of these states decide which part of the revenue is allocated in each case. (Paragraph 150)
7.2 Law about equality for disabled persons

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<tr>
<th>State</th>
<th>Law</th>
<th>NR.</th>
<th>From</th>
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</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Law about equality for disabled persons (Disability Discrimination</td>
<td>BGBI I 2002, 1468</td>
<td>27 April 2002</td>
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<tr>
<td></td>
<td>Act – BGG)</td>
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7.2.1 Infrastructures

Public ways, places and roads as well as publicly accessible transport installations and conveyances in public passenger transport are to be arranged barrier-free in accordance with the conditions of the relevant legislation. (Paragraph 8)

* Remarks (Buildings)

Federal public buildings shall be in accordance with the recognised rules in order to make them accessible and usable by disabled persons. (Paragraph 8)

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20 The law fulfils the order of article 3 from the Basic Law, which says that nobody shall be disadvantaged because of their disability. It refers to equal opportunities and elimination of barriers in public places. The goal of this law is the elimination and the prevention of disadvantages of disabled persons as well as the guarantee of equal rights for them. With the entry into force of this law, further laws on this goal were changed. (Paragraph 1)

21 The services and institutions of the Federal Administration, including the federal bodies, public institutes and foundations shall actively promote the mentioned goals. (Paragraph 7)
### 7.3 Financial assistance for the improvement of transport conditions

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<th>State</th>
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<tbody>
<tr>
<td>Germany</td>
<td>Law about financial assistance of the federation for the improvement of transport conditions of the municipalities (municipality transport financing law - GVFG)</td>
<td>BGBl I 1971, 239</td>
<td>27 April 2002 23</td>
</tr>
</tbody>
</table>

#### 7.3.1 Costs / Financing

**7.3.1.1 Capital outlays**

Financial support for projects on improvement of traffic conditions is granted only if barrier freedom is secured. The federal government can promote the following projects by means of financial assistance and shall take into account the interests of disabled persons and other people with mobility impairments and the requirements for barrier freedom. (Paragraph 2)

Building or development of traffic routes (as far as they serve local public passenger traffic):
- For trams, underground as well as specially designed trains on non-federal railways
- Building or development of central bus stations and stops
- Acceleration measures for public transport (computer controlled operating control systems and technical measures for the control of light signals)
- The procurement of standard line buses and articulated buses, as far as they are necessary for maintenance and improvement of regular transport services and also the modernisation and re-equipment of existing tram vehicles.

The condition for the assistance mentioned in Paragraph 2 is, among others, that the plans respond as far as possible to the needs of disabled and mobility impaired people. During planning, the views of the appropriate representative for disabled issues or the disabled advisory committees should be heard. (Paragraph 3)

For projects which are to receive financial assistance, programs are to be set up for the period of the respective financial plan. (Paragraph 5)

Beyond the execution of the programs, the federal states annually provide an overview of the number of promoted projects and the total of allowances paid from the financial assistance to the Federal Minister for Transport. Reporting of the federal states covers the promoted projects with the goal of barrier freedom. (Paragraph 8)

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22 The federal government grants the federal states financial support for investments in order to improve transport conditions in the municipalities. (Paragraph 1)

23 Changed by the Law on Equality for Disabled Persons and the alteration of other laws.

24 The referred projects shall be mentioned in a traffic master plan or an equivalent plan and the remaining financing of the project or a section of the project with individual transport relevance shall be ensured. (Paragraph 3) The financial assistance provided by the federation for projects is up to 75 per cent. (Paragraph 4)

25 Barrier freedom concerns structural and other installations, means of transport, technical equipment, data processing systems, acoustic and visual sources of information and communication devices if they are usable by disabled people and do not discriminate against their accessibility and mobility. (Paragraph 4)
7.4 Public Transport Law

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<tr>
<th>State</th>
<th>Law</th>
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<tbody>
<tr>
<td>Germany</td>
<td>Public Transport Law (PBefG) 26</td>
<td>BGBl I 1961, 241</td>
<td>27 April 2002 27</td>
</tr>
</tbody>
</table>

7.4.1 Vehicles

7.4.1.1 Trains
The present law applied to trams also applies for underground railways, elevated railways, and similar railways. (Paragraph 4)

7.4.1.2 Trams
New equipment for trams may only be installed if it had been accounted for in the plan. Nevertheless, planning permission is dispensable if the changes are of an insignificant importance and if other public interests are not affected. (Paragr. 28)
With regard to special transport conditions, the authorising agency can require a change of the conditions if the circumstances have changed substantially or if the new traffic criteria leads to traffic improvements in the area. These transport conditions shall be announced by the transport operator before their local introduction. (Paragraph 39)

7.4.1.3 Buses
New equipment for trolley buses may only be installed if they were accounted for in the plan. Nevertheless, planning permission is dispensable if the changes are of insignificant importance and if other public interests are not affected. (Paragr. 41)
With regard to special transport conditions, the authorising agency can require a change of the conditions if the circumstances change substantially or if the new traffic criteria leads to traffic improvements in the area. These transport conditions shall be announced by the transport operator before their local introduction. (Paragraphs 41 and 45)

* Remarks (Plans)
The urban traffic plan has to consider the interests of disabled people and other persons with mobility impairment with the goal of achieving a barrier-free use of local public transport and shall contain statements about temporal defaults and necessary measures to make it practicable. When developing the urban traffic plan, the views of disabled associations and disabled advisory committees should be heard (Paragraph 8 28). This urban traffic plan constitutes the framework for the development of a local public transport. The application for issuing permits for regular line traffic must demonstrate the measures which will be applied to achieve the most far-reaching barrier-free use of the transportation in question (Paragraph 12 29). Approval can be denied, if the transportation does not correspond with the urban traffic plan according to Paragraph 8 (Paragraph 13 30)

26 The remunerated or commercial transport of persons by trams, buses and trolley buses is subject to the regulations of this law. The Federal Minister for Transport with agreement of the Parliament issues the necessary regulations for the execution of this law.
27 Changed by the Law about the Equality for Disabled Persons and the alteration of other laws.
28 Changed by Paragraph 49 from the Law about equality for disabled persons (BGG).
29 Changed by Paragraph 49 from the Law about equality for disabled persons (BGG).
30 Changed by Paragraph 49 from the Law about equality for disabled persons (BGG):
8. Italy

8.1 Law for the assistance, social integration and rights of disabled persons

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<tr>
<th>State</th>
<th>Law</th>
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<tbody>
<tr>
<td>Italy</td>
<td>Law for the assistance, social integration and rights of disabled persons</td>
<td>104/92</td>
<td>5 February 1992</td>
</tr>
</tbody>
</table>

8.1.1 Vehicles
Within a year of the date of the present law coming into force, the Minister of Transport approves at least one prototype of an urban bus, a taxi and of a railway carriage, in compliance with the purposes of the present law. (Article 26)

8.1.2 Infrastructures
The regions shall provide the possibility of movement for disabled persons in such a way that they have the same conditions as other citizens, public transport services adapted to them as well as alternative services. (Article 26)

8.1.2.1 Platforms (Rapid transit railway)
The architectural barriers which obstruct the access of disabled persons to buildings and vehicles shall be eliminated. (Article 26)

8.1.2.2 Stations (Underground)
The architectural barriers which obstruct the access of disabled persons to buildings and vehicles shall be eliminated. (Article 26)

8.1.3 Transport services provided

8.1.3.1 Stop density
Within six months of this law coming into force, the regions shall elaborate plans for the mobility of persons with disabilities, which shall foresee alternative services for areas not covered by public transport services. (Article 26)

8.1.4 Costs / Financing

8.1.4.1 Capital outlays
On the basis of regional plans, the Minister of Transport shall predispose of funds in order to adapt or substitute the means of transport referred to by the present law. (Article 26)
A quota not inferior to 1 percent of the authorities’ amounts is intended to eliminate the architectural barriers for the benefit of railway-entities. (Article 26)

* Remarks (Private Transport)
The law also takes into account the private transport of permanently disabled persons so that they are entitled to reduced fares and fixed parking spaces. (Articles 27 and 28)
8.2 Regulation norms for the elimination of architectural barriers

<table>
<thead>
<tr>
<th>State</th>
<th>Decree</th>
<th>NR.</th>
<th>From</th>
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<tbody>
<tr>
<td>Italy</td>
<td>Regulation norms for the elimination of architectural barriers that make access to public buildings, spaces and services impossible</td>
<td>D.P.R. n. 503</td>
<td>24 July 1996</td>
</tr>
</tbody>
</table>

8.2.1 Vehicles

8.2.1.1 Trains
There shall be 3 spaces close to the exit door reserved for people with reduced mobility. (Article 24)
At least in one of the carriages there shall be a corridor with a sufficiently wide space in order to allow the parking of wheelchairs without obstructing the passage of other passengers. Such spaces must be equipped with restraints placed in a suitable way in order to enable the restraint of a wheelchair. (Article 24)

8.2.1.2 Trams
There shall be 3 spaces close to the exit door reserved for people with reduced mobility. (Article 24)
At least in one of the carriages there shall be a corridor with a sufficiently wide space in order to allow the parking of wheelchairs without obstructing the passage of other passengers. Such spaces must be equipped with restraints placed in a suitable way in order to enable the restraint of a wheelchair. (Article 24)

8.2.2 Infrastructures

8.2.2.1 Stations (Underground)
Metropolitan stations must provide the possibility of parking a wheelchair as well as access for a person in a wheelchair. In case of unevenness, there shall be lifts and ramps in order to facilitate the movement of non-walking persons with their own wheelchair. (Article 24)

* Remarks (Long-distance transport)
There are also some requirements relating to rail stations (Article 25), navigation services (Articles 26 and 27) and airports (Articles 28 and 29) in order to permit better movement for a person with reduced mobility.
8.3 Regulations on behalf of disabled people and civil invalids

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<tr>
<th>State</th>
<th>Decree</th>
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<tbody>
<tr>
<td>Italy</td>
<td>Regulations on behalf of disabled people and civil invalids, regarding architectural barriers and public transport</td>
<td>D.P.R. n. 384</td>
<td>27 April 1978</td>
</tr>
</tbody>
</table>

8.3.1 Vehicles

8.3.1.1 Trains
There must be no fewer than 3 spaces close to the exit door reserved for disabled persons. The doors of the vehicles must enable the passage of a wheelchair to the interior of at least one car. The corridor shall also be sufficiently wide to allow the parking of a wheelchair without hindering the passage of other passengers. Such spaces must be equipped with restraints placed in such a way that a wheelchair can be restrained. (Article 19)

8.3.1.2 Trams
There must be no fewer than 3 spaces close to the exit door reserved for disabled persons. The doors of the vehicles must enable the passage of a wheelchair to the interior of at least one car. The corridor shall also be sufficiently wide to allow the parking of a wheelchair without hindering the passage of other passengers. Such spaces must be equipped with restraints placed in such a way that a wheelchair can be restrained. (Article 19)

8.3.1.3 Buses
There must be no fewer than 3 spaces close to the exit door reserved for disabled persons. The doors of the vehicles must enable the passage of a wheelchair to the interior of at least one car. The corridor shall also be sufficiently wide to allow the parking of a wheelchair without hindering the passage of other passengers. Such spaces must be equipped with restraints placed in such a way that a wheelchair can be restrained. (Article 19)

8.3.2 Infrastructures

8.3.2.1 Stations (Underground)
Metropolitan stations shall be accessible and provide parking and they should have suitable lifts and ramps in case of unevenness in order to facilitate the movement of non-walking persons. (Article 19)
Services for travellers have to be accessible to disabled persons. (Article 24)

* Remarks (Long distance transport)
There are also some requirements relating to railway stations (Article 20), navigation services (Articles 21 and 22) and airports (Articles 23) in order to permit better movement for a person with reduced mobility.
8.4 Bestowal to all regions and local entities

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<tr>
<th>State</th>
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<tr>
<td>Italy</td>
<td>Bestowal to all regions and local entities which have competencies and functions concerning local public transport to the norm of the 4th article of law n° 59</td>
<td>D. L. n. 422</td>
<td>19 November 1997</td>
</tr>
</tbody>
</table>

8.4.1 Vehicles
Recourse to mobility and to suitable transport technology in order to satisfy transport requirements, giving particular attention to those persons with reduced mobility capacities. (Article 16)

8.4.2 Costs / Financing

8.4.2.1 Capital outlays
Regarding minimal services, the regional plans for transport and the programmed inflation rate, every region should have an annual budget for transport.

* Remarks (Competencies)
Local and regional public transport matters come under the exclusive competence of the State (Article 4):

- international agreements, conventions and deals relative to the international transport of persons and goods;
- security matters;
- the adoption of guidance lines for the reduction of pollution deriving from the public transport system.

The tasks relative to the public transport service of regional and local interest are conferred to the regional and local authorities except those in the competence of the State. (Article 5)
For the regulation of public transport services, with reference to minimal services, the regions approve triennial programs of public transport services as (Article 14):

- network and organisation of the services;
- modal and tariff integration;
- the resources for investments;

31 For the regions with special statute and for the independent provinces of Trento and Bolzano the bestowal of the functions are dispensed according to the statutes and through appropriate norms of performance. (Article 1)
32 Please refer to Remarks.
33 Defined by the D.P.R. n. 753 of 11 July 1980.
34 For the determination of the minimal services, the regions define quantity and quality standards of public transport services taking into account the following criteria (Article 16):
- Recourse to mobility and to suitable transport technology in order to satisfy transport requirements, giving particular attention to those persons with reduced mobility capacities;
- Guarantee of sufficient transport services.
• determination of tariffs;
• performance and revision of public service contracts;
• system of services monitoring;
• criteria for congestion and pollution reduction.
9. Portugal

9.1 Law 123/97

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<th>State</th>
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<tr>
<td>Portugal</td>
<td>Decreto Lei</td>
<td>123/97</td>
<td>22 May 1997</td>
</tr>
</tbody>
</table>

9.1.1 Infrastructures

9.1.1.1 Stations (Underground)

The technical norms referred to in this Law are applied to underground stations (...35). (Article 2) The norms concern the implementation of ramps and lifts, which should follow the limits stipulated by this law. With regard to ramps, these limits refer to the maximum inclination and extension, as well as to the texture of the surfaces. In relation to lifts, they refer to the dimensions, command buttons and to the limit of stopping precision. (Annex I)

* Remarks (Buildings)

Suppression of urban and architectural barriers in the process of total social integration of people with permanent or temporary conditioned mobility. Installations and buildings, as well as the respective surrounding spaces, already constructed and in construction that do not guarantee the accessibility of people with conditional mobility will have to be adapted within the stated period of seven years. (Article 4) The technical norms referred to in this Law also apply to public transport stops. (Article 2) These technical norms concern the implementation of stop shelters in a way that they do not disturb the mobility of disabled persons (Annex I).

35 They are also applied to rail stations, maritime and fluvial station platforms, airport and aerodrome station platforms, stations of fuel supplying and service areas. (Article 2)
10. Spain

10.1 Social integration of disabled persons

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<th>State</th>
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<tbody>
<tr>
<td>Spain</td>
<td>Social integration of disabled persons</td>
<td>13/1982</td>
<td>7 April 1982</td>
</tr>
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</table>

10.1.1 Infrastructures
Within a year of publication of this law, technical measures are to be adopted in order to gradually adapt public transport to facilitate the mobility of persons with disabilities. (Article 59)

10.1.2 Costs / Financing
The different benefits, subsidies, and services contained in the law will be financed from the General Budgets of the State, and those of the Independent Communities and Local Corporations, according to their respective competencies. (Article 66)

10.1.2.1 Transportation costs
One of the priorities of this law is the subsidy of mobility and the compensation of transport costs. (Article 12)

* Remarks (Buildings)
The construction, extension and renewal of public buildings, as well as the planning and urbanisation of public routes, parks and gardens will take place so that they are accessible and usable for people with disabilities. The repairs that demanded rehabilitation and normal conservation of existing buildings, as well as works of reconstruction or conservation of monuments of historical or artistic interest are excluded from the previous obligation. (Article 54)
11. Sweden

11.1 Law on disability-adapted public passenger transport

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<th>State</th>
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<tbody>
<tr>
<td>Sweden</td>
<td>Law on disability-adapted public passenger transport</td>
<td>1979:558</td>
<td>14th June 1979</td>
</tr>
</tbody>
</table>

Whoever supervises public transport and whoever runs such transport must ensure that traffic is adapted for passengers with functional disabilities. (Article 2)

### 11.1.1 Vehicles

When public passenger transport is planned and implemented, the special needs of the functionally disabled must be taken into consideration. The means of transport that are used shall as far as possible be adapted for passengers with functional disabilities. (Article 2)
11.2 Ordinance on disability-adapted public passenger transport

<table>
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<th>State</th>
<th>Order</th>
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<th>From</th>
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</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>Ordinance on disability-adapted public passenger transport</td>
<td>1980:398</td>
<td>5th June 1980</td>
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</table>

The adaptation shall take place at the rate and to the extent deemed reasonable in relation to the purpose and to the technical and economic preconditions of those who run the transport. (Article 2)
Before regulations are issued, the Agency will consult with the authorities and disabled organisations involved and with the representatives of those who operate the transport. (Article 4)

11.2.1 Infrastructures
In the adaptation, consideration shall be given to the special conditions for public passenger transport in built-up areas as well as for passenger safety.

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37 This Ordinance applies to adaptation for the disabled of public transport which is referred to in the Law on disability-adapted public passenger transport (1979: 588).
11.3 The Statute-Book of the Transport Council

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The Transport Council prescribes on the basis of Article 4 of the Ordinance on disability-adapted public passenger transport (1980:398) that Article 2 of the Transport Council’s regulations on disability-adapted public transport (TPRFS 1985:10) must read as follows and that in the appendix to the regulations of the Transport Council (TPRFS 1985:10) sections 19 and 20 must read as follows.

11.3.1 Vehicles

11.3.1.1 Trains

The following means of transport which are used in public passenger transport shall be disability-adapted (Article 2):
- Engine-powered cars which are equipped for the transport of persons supplied by the manufacturer after 1959;
- Underground carriages supplied by the manufacturer after 1959;
- Power cars supplied by the manufacturer after 1978;
- Suburban trains of types X1 and X10 and future vehicle types supplied by the manufacturer after 1966;

11.3.1.2 Trams

Trams supplied by the manufacturer after 1966 shall be disability-adapted. (Article 2)

11.3.1.3 Buses

Disability adaptation of bus models from 1989 or later, equipped for 13 or more adult seated passengers:
- **Signs** - On the front of buses and at the entrance door the bus line number and/or destination shall be indicated. Figures and letters must be easy to read and be colour-contrasted.
- **Advertising** - Bus stop advertising shall be carried in such a way that the needs of the visually impaired for audible information are met. The needs of those with hearing disability must also be met in a suitable manner, e.g. by means of line maps, hearing loop or sign arrangement.
- **Signal arrangement for disembarking** - Beside the seats which are especially designed for persons with disabilities there must be a signal arrangement which is easy to use for the passengers. A bus equipped for more than 19 seated pas-

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38 But not those whose disability adaptation is regulated in a different, separate regulation
39 Underground carriages also mean those carriages for passengers traffic which run on the Saltsjö track.
40 But not suburban trains of type X1 or X10 or power cars whose disability adaptation is regulated in another, separate regulation.
passengers must have signal lines/stripes or signal buttons for disembarking. These lines/stripes or buttons must be placed in such a way that both the visually impaired and other passengers can attract the attention of the driver without difficulty.

- **Steps** – Specifications regarding their measures and the lowering of the body, if the bus has a design which permits it. They shall be constructed in such a way that they facilitate the possibilities of movement of people with disabilities as well as being safe and easily identified.

- **Doors** – At least one door opening shall have a clear width of at least 750 mm designed in such a way that a passenger sitting in his wheelchair can be wheeled into the bus. If a permanent lifting device for wheelchairs is fitted in the door opening, the width measurement must be taken with the lift in the operating position.

- **Handles, handrails and supports** – handles and handrails shall be present at all door openings intended for passengers on both sides of the entrance for persons with reduced mobility. They shall also be present at the place where payment for or presentation of tickets for travel takes place. They shall be colour-contrasted. In order to make it easy for passengers to move in the bus, graspable and contrast-marked handles or corresponding supports shall be present. Seat belts shall be made available to an equal extent as there are places for wheelchair using passengers, which shall be easily used.

- **Wheelchair user boarding** – Beside the door which is adapted for wheelchair-using passengers shall:
  - have a floor height which does not exceed 230 mm or
  - be fitted with a lift or
  - be prepared for being provided with a permanently fitted lifting device for wheelchairs (measures and specifications concerning the lifting place for the lifting device).

- **Floor material** – in the walking space material shall be used which has small risk of slippage.

- **Seats** – At least two forward-facing seats, specially designed and marked for passengers with disabilities shall be present in the part of the bus which, with respect to the entry conditions and place for payment, are the most usual. They shall be designed so that sufficient space and handles (measures and specifications) are present.

- **Wheelchair spaces** – Measures and requirements for these spaces. They shall be provided with fixed points for the anchoring arrangement. The space from the boarding door to the wheelchair space shall permit obstacle-free movement of wheelchairs.

- **Lighting** – The buses shall have internal lighting which in darkness permits safe boarding and alighting at stops, possibly pay and seek a suitable seat. Requirements concerning the lighting.

### 11.3.2 Transport services provided

#### 11.3.2.1 Driving services

Whoever supervises public transport and whoever runs such transport must ensure that the traffic is adapted for passengers with functional disabilities.

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41 The fixed points for the anchoring arrangement shall fulfill suitable requirements in the regulations of the Traffic Safety Board (TSVFS 1978: 9) on equipment for the securing of loads
11.3.3 Information systems

11.3.3.1 Signs

On the front of bus models from 1989 or later (equipped for 13 or more adult seated passengers) and at the entrance door the bus line number and/or destination shall be indicated. Figures and letters must be easy to read and be colour-contrasted. The needs of those with hearing disabilities must also be met in a suitable manner, e.g. by means of line maps, hearing loop or sign arrangement. Beside the seats which are specially designed for disabled persons there must be a signal arrangement which is easily to use for the passengers. A bus equipped for more than 19 seated passengers must have signal lines/stripes or signal buttons for disembarking. These lines/stripes or buttons must be placed in such a way that both the visually impaired and other passengers can attract the attention of the driver without difficulty.
12. United Kingdom

12.1 The Rail Vehicle Accessibility Regulations 1998

<table>
<thead>
<tr>
<th>State</th>
<th>Law</th>
<th>No.</th>
<th>From</th>
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<tbody>
<tr>
<td>United Kingdom</td>
<td>The Rail Vehicle Accessibility Regulations 1998 42</td>
<td>2456</td>
<td>1 November 1998</td>
</tr>
</tbody>
</table>

12.1.1 Vehicles

12.1.1.1 Trains

Regulations in a regulated rail vehicle regarding:

- **door controls** (Regulation 5) – their position, operation and identification shall permit security and free movement for a disabled person.

- **steps for use by passengers at any external doorway** (Regulation 6) – their surface material, identification and measures shall permit security and free movement for a disabled person.

- **floors of areas used by passengers** (Regulation 7) – possibility to differentiate each part of the vehicle, for example “the floor of a vestibule adjoining a doorway in the side of a vehicle shall contrast with the adjacent floor in the passenger saloon of that vehicle.”

- **seats** (Regulation 8) – “Not less than 10 per cent of the seats in a regulated rail vehicle or 8 seats (whichever is the lesser number) shall be designated as priority seats for the use of disabled persons.”

- **Interior transparent surfaces** (Regulation 10) – the transparent surfaces cannot “be separated from an area in which a disabled person can walk, or go in a wheelchair, by a seat, table or other fitting” or should be easily identified or “bounded on any side which is not attached to the floor, wall or ceiling of the vehicle by a handrail”.

- **Handrails and Handholds** (Regulation 11) – regulations concerning the dimensions, having handrails or handholds which are easily identifiable.

- **Wheelchair spaces** (Regulation 15) – “a regulated rail vehicle which does not form part of a train shall contain not less than one wheelchair space”.

- **Wheelchair space specifications** (Regulation 16) – there shall be no obstruction of the space and it should “be not less than 1300 millimetres long measured in the longitudinal plane of the regulated rail vehicle and not less than 750 millimetres wide measured in the transverse plane of that vehicle”.

- **Boarding devices** (Regulation 23) – specifications concerning their surface; lift-platforms, which shall present certain measures and capacity; power-operated ramp, which shall be operated by a disabled person in a wheelchair. “If the regulated rail vehicle is not fitted with a lift or a power-operated ramp, the operator of the vehicle shall provide assistance in deploying and using a separate ramp”.

There are also regulations concerning toilets for disabled persons in wheelchairs and telephones, which shall be reachable by disabled persons.

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42 These Regulations apply to rail vehicles used on railways, tramways, monorail systems or magnetic levitation systems and they have been made to date under Part V of the Disability Discrimination Act 1995.
12.1.1.2 Trams

Regulations regarding:
- tramcar request-stop control (Regulation 9), which shall be reachable by a person in a wheelchair – its height, identification and operation.
- Wheelchair spaces (Regulation 15) – “A tramcar with accommodation for 100 or more persons shall contain not less than two wheelchair spaces.”

The Regulations related to trains should also be applied to trams.

12.1.2 Information systems

12.1.2.1 Signs

“When power-operated doors are closed by a member of the operator’s staff the illumination of each such control device shall cease not less than 3 seconds before the doors start to close.” ((2) of Regulation 5)

As mentioned by Regulation 8, “there shall be a sign on or near to a priority seat indicating that disabled persons have priority for the use of that seat.”

12.1.2.2 Announcements

“Each passenger doorway in the side of a regulated rail vehicle shall be fitted with an audible warning device which shall emit warning sounds 43 (...) inside and outside the vehicle in the proximity of each control device for that doorway or, if there is no such control device, adjacent to that doorway.” (Regulation 4)

Whilst the vehicle is stationary at a station or a tram stop the system for visual announcements shall “announce the destination of the vehicle, or, if the vehicle is following a circular route, the name or number of the route, and, in the case of systems inside the passenger saloon only, to announce the next stop.” They shall also announce any other information, as delays or emergency announcements. (Regulation 13)

Concerning the announcements on visual systems, the words and numbers shall be legible by everyone. (Regulation 13)

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43 In this regulation “sound” includes the spoken word.
12.2 The Public Service Vehicles Accessibility Regulations 2000

<table>
<thead>
<tr>
<th>State</th>
<th>Law</th>
<th>No.</th>
<th>From</th>
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<tbody>
<tr>
<td>United Kingdom</td>
<td>The Public Service Vehicles Accessibility Regulations 2000</td>
<td>3318</td>
<td>15 January 2001</td>
</tr>
</tbody>
</table>

12.2.1 Vehicles

12.2.1.1 Buses

Requirements concerning wheelchair accessibility regarding:

- **Wheelchair spaces** (Part 1 from Schedule 1, paragraph 2) – “A regulated public service vehicle shall be fitted with not less than one wheelchair space”, which shall be fitted to the lower deck in case of the regulated public service vehicle being a double-deck bus or a double-deck coach.

- **Forward-facing wheelchairs** (Part 1 from Schedule 1, paragraph 3) – a wheelchair space shall be fitted with a wheelchair restrained system \(^{45}\) and with a wheelchair user restraint \(^{46}\), which shall either be secure and be capable of being easily released in case of emergency.

- On or near a seat reserved for a disabled person shall be a sign stating the following "Please give up this seat for a wheelchair user" or stating words of equivalent meaning.

- **Rearward-facing wheelchairs** (Part 1 from Schedule 1, paragraph 4) – “a wheelchair space shall allow the carriage of a wheelchair and a wheelchair user seated in the wheelchair and facing the rear of the vehicle” and shall also be fitted with a backrest and with a horizontal handrail. There shall also be a sign on or near a seat stating the following "Please give up this seat for a wheelchair user" or stating words of equivalent meaning.

- **Boarding lifts and ramps** (Part 1 from Schedule 1, paragraph 5) – "A regulated public service vehicle shall be fitted with not less than one boarding lift or one boarding ramp, or shall carry not less than one portable ramp". There are also regulations concerning its measures and security.

- **Entrances and exits** (Part 1 from Schedule 1, paragraph 6) – an entrance or exit which should intend to provide access for a wheelchair user shall have a clear unobstructed width (not less than 800mm).

- **Gangways** (Part 1 from Schedule 1, paragraph 7) – “Any gangway between a wheelchair space and an entrance or exit intended to provide access for a wheelchair user shall allow a reference wheelchair to be moved from an entrance to the wheelchair space and from the wheelchair space to an exit”.

\(^{44}\) These Regulations are applied to public service vehicles of the types:
- single-deck bus which weighs more than 7.5 tonnes;
- single-deck bus which weighs 7.5 tonnes or less;
- double-deck bus;
- single-deck or double-deck coach,
and they have been made to date under Par V of the Disability Discrimination Act 1995.

\(^{45}\) "Wheelchair restraint system" means a system which is designed to keep a wheelchair restrained within the wheelchair space.

\(^{46}\) "Wheelchair user restraint" means a system which is designed to keep a wheelchair user restrained in the wheelchair.
Communication devices (Part 1 from Schedule 1, paragraph 9) – “A communication device shall be fitted (...) adjacent to a wheelchair space (...) and on the exterior of the vehicle adjacent to any entrance for wheelchair access”.

Requirements for single-deck and double-deck buses concerning:

- **Floor** (Schedule 2, paragraph 2) – “All floors within the total floor area of a regulated public service vehicle shall be slip-resistant” and there shall be a priority floor area which shall not contain steps, contain priority seats and have a slope of not more than 3° in any direction, or not more than 5° in any direction within the doorway area.
- **Priority seats** (Schedule 2, paragraph 3) – “A regulated public service vehicle shall have not less than 4 seats” and shall be as close as practicable to a priority entrance and be “adequate space under or adjacent to at least one priority seat for the comfortable accommodation of a dog trained to assist a disabled person”. A priority seat shall be easily reachable and there shall be a sign indicating that disabled persons have priority for the use of that seat.
- **Steps** (Schedule 2, paragraph 4) – their surface material, identification and measures shall permit security and free movement for a disabled person.
- **Handrails and Handholds** (Schedule 2, paragraph 5) – regulations concerning the dimensions and their positions, handrails or handholds being easily identifiable. They shall be fitted along one or both sides of a gangway, in any area where passengers may stand other than a gangway and on both sides of the interior of an entrance or exit.
- **Communication devices** (Schedule 2, paragraph 6) – A communication device shall be fitted within reach of a person seated in a priority seat and adjacent to not less then every third row of seats.

The requirements for single-deck and double-deck coaches are similar to the ones concerning buses.

12.2.2 Information systems

12.2.2.1 Announcements

Any power-operated boarding lift or power-operated boarding ramp fitted to a regulated public service vehicle shall produce an audible signal when in operation (Part 1 from Schedule 1, paragraph 5).

An illuminated stopping sign shall display the word “stopping” or words to that effect and shall not use only capital letters (Part 1 from Schedule 1, paragraph 9 and Schedule 2, paragraph 6).

“A regulated public service vehicle shall be fitted with a route number display and a destination display in the following positions – on the front of the vehicle, as close as practicable to that part of the windscreen which is within the driver's field of vision; and on the near side of the vehicle adjacent to the entrance which is closest to the front of the vehicle” (Schedule 2, paragraph 5), and shall also be fitted with a route number display on the rear of the vehicle.
Annex IV – Survey description

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1. The survey concept for data collection

In order to obtain an overview of the data and developments regarding people with reduced mobility (PRM) and transport services for this group of people, several surveys were carried out. A considerable amount of data was retrieved from Eurostat and national statistics concerning surface area, population, demographic development and age distribution, GDP (Gross Domestic Product) etc. of the Member States in order to obtain as comprehensive a picture as possible of the situation in the EU States. Further information which was required was requested in writing.

An important step was the collection of already existing data concerning PRM from national transport associations, urban transport companies, municipal authorities and associations representing disabled and elderly people at national and local level in the 15 Member States for the period 1990 to 2001 and, where available, forecasts until 2010. In addition vehicle manufacturers were approached to obtain information on technological developments and information was collected on the dedicated EU national action plans.

In order to obtain the required information, 3 separate EU-wide written surveys were conducted to assess the current situation and further developments in the area of PRM. These surveys were carried out in Spring 2002.

Three target groups were determined for the surveys:

- National organisations in the 15 EU Member States
- Vehicles manufacturers within the EU
- Municipal organisations in the 15 EU Member States.

Within these target groups several institutes were surveyed in order, on the one hand to increase the feedback quota, and on the other to check the consistency of the information provided in the questionnaires. Three different questionnaires were prepared for the national organisations, one each respectively for the national administrations, the national public transport organisations and the national disabled
organisations. The city questionnaire was also prepared in 3 different versions; for the municipal transport administrations, the urban transport operators and the municipal disabled organisations. The questionnaires for the vehicle manufacturers were divided into separate questionnaires for manufacturers of rail-bound vehicles and of buses.

The survey mainly used the empirical data of the countries and cities. This data was used to make recommendations for the improvement of the situation of PRM in local public transport. The aim was to place an emphasis on the collection and assessment of practical approaches to improving barrier-free local public transport which have already been realised or which are planned within the 15 EU Member States and to give a secondary role to technical issues. Recommendations which have already been tried and tested can thus be converted into useful measures which can be implemented.

The total number of questionnaires sent out as part of the study was 354.

2. Survey at national level

2.1 The emphasis of the national surveys

The emphasis of the surveys at national level was placed on the collation of data on PRM issues and on the preparation of a list of possible criteria to be used in the selection of the cities to be surveyed at a later stage. To this end, questionnaires for three different national target groups were developed, namely for national administrations, national disabled associations and for national public transport organisations. The questionnaires covered, among others, the following complex themes: number of people with disabilities, obstacles to mobility, the integration of people with disabilities into local public transport, public transport services provided, as well as laws and regulations.

Questionnaires were also developed for European vehicle manufacturers, one for manufacturers of rail-bound vehicles and one for bus manufacturers. Questions referring to the latest technological developments, locations where this new technology was being deployed, costs, and further possibilities for development were included. This information was complemented by an exchange of experiences between the BVG and other transport operators as well as taking into consideration in-house developments and current status with regard to the implementation of the latest technology.

2.2 Conducting the survey at national level

In written surveys it can be assumed that not all those questioned will respond completely, but that a response quota of approximately 33 % - 50 % can be expected. To improve the feedback from the national questionnaires from each country, up to four different ministries were approached which deal with issues concerning “people with disabilities” and “transport”, namely the ministries of health, social affairs, the interior and transport.

Within the survey at national level, a total of 91 questionnaires were dispatched to institutes in all EU Member States, of which 61 were sent to ministries in all 15 states, 15 to national transport associations in 11 States (4 States do not have a National Transport Association) and 15 to national disabled associations in all 15 States. The response rate to the questionnaires was, approximately 39 % for ministries (24 questionnaires), 45 % for national transport associations (5 questionnaires) and as high as 66 % (10 questionnaires) for national disabled associations. Participation in the surveys conducted was of course voluntary.
Unfortunately, despite several reminders, no questionnaires were returned by Greece. It is presumed that language problems were encountered in replying to the questionnaires, which were in English.

3. Survey of selected cities in the EU Member States

3.1 Selection of cities to be surveyed

The elaboration of recommendations to improve barrier-free local public transport systems was, in this study, based as far as possible on practical experiences from as many different EU cities as possible. The necessary information from the municipal authorities, transport operators and disabled organisations was again collected by means of written surveys. In order, on the one hand, to obtain a representative selection of cities, but on the other hand to limit the total number of cities, it was decided to first compile and then agree on a list of criteria to be used in the selection.

The extent of the random sampling was first determined. The 15 Member States were divided according to population size into small countries (less than 5m inhabitants), medium-sized countries (5 – 25m inhabitants) and big countries (more than 25m inhabitants). For small countries, 2-3 cities were selected, for medium-sized countries 4 cities and for big countries 8 cities. The capital city was selected in all cases. This provided a total of 77 cities to be surveyed, which had to fulfil a wide spectrum of criteria in order to be able to take into consideration as many applications as possible.

3.2 Developing selection criteria

A list of selection criteria was then developed to determine the 77 towns and cities for participation in the survey. The suggestions for criteria included political indicators, structural data, topographic conditions, social indicators, transport indicators and accessibility features. Four main criteria were selected with 2 or 3 subdivisions
which could easily be covered by the information contained in the questionnaires returned or by using the Eurostat data bank.

- Size of city (big – medium – small)
- Density of population (high – low)
- Rate of PRM (high – low)
- Prosperity of area (high – low)

As the biggest variations were in the population figures of the cities, three characteristics were determined. In other cases, two characteristics were sufficient to describe the cities. The density of population could be calculated from the population figure and the size of the city. The rate of PRM was established on the basis of the number of people over the age of 65 because the numbers for this sector of the population are considerably higher and thus more indicative than the number (in a narrow sense) of people with disabilities. For the prosperity of the area, the GDP of the region in which the city is located was used. This determination of criteria resulted in 75 combination possibilities and therefore corresponded ideally to the number of cities to be selected (77 cities).

National differences meant that the cities from each Member State could not be directly compared on the basis of the selected criteria. Some countries have big cities and predominately wealthy regions, while others only have small cities and poorer regions. For this reason, the criteria were applied for each country separately, whereby the cities of each individual country were grouped according to the above-mentioned criteria. In Germany, for example, medium-sized cities are defined as cities with a population of 400,000 to 700,000, on the other hand in Portugal, medium-sized cities have 100,000 to 300,000 inhabitants. Similarly, for other criteria: in France wealthy regions have a GDP of +19,000 €/inhabitant while in Greece the figure is +10,000.

Figure 36.: Selection of cities

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<thead>
<tr>
<th>State Mio</th>
<th>City 1</th>
<th>City 2</th>
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<td>Berlin (capital)</td>
<td>München 1-4-7-8</td>
<td>Frankfurt 2-4-7-8</td>
<td>Bremen 2-4-6-8</td>
<td>Dresden 2-5-6-9</td>
<td>Karlsruhe 3-4-6-8</td>
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1st criterion: size of city
2nd criterion: dens. of popul.
3rd criterion: rate of PRM
4th criterion: level of GDP
Consequently, for each country and for each characteristic a selection could be made from a more or less equal number of cities. The same number of cities could thus be selected for each country according to the given characteristics. Greece therefore has the same number of wealthy and poor cities as France on the basis of its own selection process. The selection was then made based on a combination of criteria, whereby the criteria were sequentially changed. Thus, when considering each criterion, variable city combinations were achieved.

In selecting the cities, great emphasis was placed on all defined characteristics being equally respected for each country, so that big and small, rich and poor cities were represented in equal numbers. In this way it was possible to include cities in the surveys which covered all characteristics occurring in the EU. Unfortunately, Eurostat data did not include details about the regional age distribution of the French population so this criterion could not be considered. As for Denmark, no regional data is available from Eurostat.

Figure 37.: Cities selected for the questionnaire
3.3 **Conducting the survey at municipal level**

Analogous to the survey at national level, three different questionnaires were developed; one for the transport operator in each of the selected cities, one for the municipal transport authorities and one for the municipal disabled associations. The questionnaires contained questions on the complex themes of statistical data, traffic behaviour in the city, public transport services offered and accessibility of public transport, financing, infrastructure and vehicles (bus, tram and underground) as well as the acceptance of development and service measures. The content of these questionnaires was discussed with members of ECMT, EFD and AGE. Comments of the aforementioned groups were thus able to be incorporated into the questionnaires, especially questions referring to municipal planning and the entire field of urban public transport.

A total of 254 questionnaires were sent out to addressees in the 77 selected cities, of which 100 were sent to transport operators (some cities have several operators), 77 to municipal authorities and 77 to disabled associations in the cities. The response rate to the surveys was 31% for municipal transport administrations (24 questionnaires), 33% for urban transport operators (33 questionnaires) and only 14% for municipal disabled associations (11 questionnaires). As a result, information was provided for 23 cities operating bus services, 16 cities operating trams, 10 cities operating an underground system and 3 cities with suburban trains.

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<th>Figure 38.: Feedback from the city questionnaires</th>
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The low response rate can be assigned to the fact that, in particular, statistical data for the group of people in question is often not available. As a large number of questionnaires was not completed, in addition to the low response rate, in part due to the unavailability of such information, not all questions of interest could be evaluated. This applies, for example, to the proportion of PRM and their mobility behaviours. Another problem is that the terms “disabled” or “mobility impaired” are defined very differently so that a comparison of the various values established is only possible to a limited extent.
It was possible to obtain a good overview of the technical equipment of vehicles and stops and their development over the last 10 years, as well as of the legal and financial conditions. Also, a lot of information is available regarding measures to improve the accessibility of local public transport as well as other improvement potential.