Our speciality = Accessibility

- Advisory & Consultancy for Stakeholders Operators, Civil Engineers/Architects on Accessibility Concepts for interoperable & intermodular public transport systems, covering all modes of transport for Persons of Reduced Mobility (PRM)

-> individual transport-
-> public transport - underground/tramway/urban/intercity bus – lightrail -> railways -> aviation

Source: Department for Transport, London, U.K.
Accessibility for Public Transport Systems

BP[i]nternational CONSULT[i]ng – The company’s Services:

• Door to Door Mobility Concepts and Development of Accessibility Services in order to provide social inclusion -\textit{\textrightarrow{ part of Urban Mobility}}

• R&D Project Management & Funding Advisory on e.g. Intelligent Transport Systems

• Cooperation with Universities & Research Institutions e.g. for Dynamic Transport Planning, Railways and Transport Engineering on an int´l level

• Shared space projects, transport projects anticipating accessibility & its critical interfaces

• safety for disabled people - Crash Severeness & Crashworthiness
Traveling Wheelchair Occupants:

Pictures, left: Austrian Federal Railways ÖBB (Infrastructure Division & Transportation Division), right: WESTbahn (A)
## Persons with reduced Mobility

### Groups according to TSI PRM

<table>
<thead>
<tr>
<th>Travel impairments</th>
<th>“Life Cycle” impairments</th>
<th>Physical impairments</th>
<th>People with communication difficulties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luggage, prams, 3 and more children, non locals</td>
<td>Children, Pregnant women, elderly people</td>
<td>Wheelchair occupants</td>
<td>Deaf and hearing impaired users</td>
</tr>
<tr>
<td>Blind and visually impaired people</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Barta/Petutschnig, 2010, Conference on Public Transport at the Ministry of Transport, Innovation & Technology, Austria
Accessibility for Public Transport Systems

Mobility Chain – Key Aspects
- Avoidance of Missing Link
- Anticipation of Critical Interfaces

Source:
Railways for All Accessibility Strategy, Department for Transport, London
Accessibility of Public Transportation Systems – Legal basis:

- “Equality & Social” Inclusion: Accessibility for Everybody ->
- Fundamentals of the UN Human Rights Convention =
- Basis of the European Disability Act & EU Strategy 2010-2020
- Bundes-Behindertengleichstellungsgesetz 2006-2016 (Austria)
- Disability Discrimination Act (UK)
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Interoperability Directives 2008/57/EC, 2004/50/EC ...

Technical Specifications of Interoperability TSI PRM, TSI PAS ...

European Standards / Norms: CEN, national Bodies

Source: Ministry of Transport, Innovation and Technology Austria,
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- Directive 2008/57/EC (conventional and High-Speed Railway System)

TSI PRM

Technical Specifications for Interoperability – Persons with Reduced Mobility

TSI PAS / Infrastructure,

all TSI subject to revision conducted by ERA -> basis for CEN Norms
Other European Transport Legislation and int´l Norms (national/international)

- ISO 7193, ISO 7176-19 (ISO 10542) : Design Requirements for wheelchairs (crashtested) & certified for use in Transportation (crash tested with 50kmh, 20g frontal/rear impact)

- Universal Acces Code (U.S.A) for accessible buildings and infrastructure, according to ADA (Americans with Disability Act), FMVSS (Federal Motor Vehicle Standard), ASI Norm B1600 Austria

Best Practice Example: ÖBB Railjet – MBB Palfinger Lift
critical Interface:

Rail Vehicle / Station Platform

Floor height vehicle / platform height

**Bahnsteighöhen in Europa**

- 380 mm
- 550 mm (EU-Standard)
- 760 mm (EU-Standard)
- 840 mm (NL)
- 915 mm (GB)
- 960 mm
- andere

Source. Kollman/Wieder, Siemens A
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**TSI PRM Structure**

**Infrastructure**

<table>
<thead>
<tr>
<th>Critical Interface:</th>
<th>Rail Vehicle / Station Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor height vehicle / platform height</td>
<td></td>
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</table>

**Rail vehicle**: Entrance Door Width) → Boarding/alighting Steps → Lighting of Steps/Entrance Area → Accessibility Aids → Room to manouvre → Handles → Level Differences → Passenger Information System → Doors inside Vehicle → Allocated Seats for the Disabled → Wheelchair Area → Standard Toilet → Universal Toilet (incl Baby Care Facilities) → Wheelchair adapted Sleeping Compartments
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European Legislation - EU Directives within Public Transportation:

Bus Directive 2001/85 ECE*:

Accessibility of the vehicle (ramps, kneeling systems, lifts) & wheelchair & occupant restraint systems (WTORS) for wheelchair occupant & bus passenger safety

*Annex VII: Directive specifies minimum requirements vs. “Free-Will” higher national requirements, Sweden: implemented higher requirements for WC-Occupant 3-Point Belts in Busses – e.g. Scandinavia (Volvo, Scania)
National Norm UK: Rail Vehicle Accessibility Regulations RVAR

National Norm GER: DIN 75078
Covering individual automotive transport and community transport services (minibuses), [M1]

NL: Code VVR minibus – rolstoel verfoer (community transport)
Blind users:

- Gap between Platform and Rail Vehicle
- Entrance area with steps
- Handrails
Usability of steps (different height and depth)

- pi...physically impaired
- bl...blind users

Source: Boarding Assistance System Evaluation Matrix, Petutschnig, Ruger, Tauschitz 2010
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Usability Testing

Source: EU – Project „MODTRAIN“

"Code of Practice (BS 8300)"

easy or comfortable: reach without much movement of the torso vs. maximum or extended -just possible with movement abilities of the upper torso.

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BP International Consulting
Glocal Marketing Services
Visually Impaired users

- Sufficient Contrast to identify the entrance
- Contrast / Steps
- Flooring of the entrance area

Deaf People

- Entrance situation bearing no Problem
- Information in real time
  (train delay, change of platforms)
- Assistance of the staff
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Elderly People

- Not only defined by age
- Combination of impairments
- Steps with handrails
Parents with Prams prefer ramps - no lift!

- Ease of use, as long as not too steep (-> TSI PRM, RVAR regulations)
- If there is no other help available, such as PRM service programs by
  - SNCF Accés+, SBB "Mobihelfer", RENFE "Atendo"
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Passengers with luggage

Long distance - every second passenger travels with oversize luggage

Source: Boarding Assistance System Evaluation Matrix, Petutschnig, Ruger, Tauschitz 20
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Difficulties for 30-50% of all travellers with luggage

- large difficulties
- difficulties
- little difficulties
- no difficulties

Source: Boarding Assistance System Evaluation Matrix, Petutschnig, Ruger, Tauschitz, July 2010
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Boarding with luggage

Approx. 15% of female and
Approx. 4% of male passengers
need assistance

Source: Boarding Assistance System Evaluation Matrix, Petutschning, Ruger, Tauschitz 2010
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BP International Consulting
Glocal Marketing Services

The U.K. Railway System & Accessibility Strategies –
A Case Study
(courtesy DfT London)

- Facts
- History
- Progress
- Challenges
FACTS

• 11 million disabled people in UK

• Disabled people have annual purchasing power of €93 billion

• By 2020, half the UK population will be 50 or older

• Obese older adults are more likely to develop conditions that limit daily living

History

• Disability Discrimination Act 1995

• Rail Vehicle Accessibility Regulations 1998

• Disability Discrimination Act 2005
Progress so far: Vehicles

- All older vehicles feature improved accessibility
- 2020 End Date – use of “targeted compliance” on older vehicles to focus effort on significant improvements
- Technical Specification for Interoperability – Persons with Reduced Mobility 2008 “TSI-PRM"
- Rail Vehicle Accessibility Regulations 2010
- 5604 vehicles built to access standards -> 45% of heavy rail fleet
Progress so far – Stations

- In 2005, just 57% of journeys started or ended at a step-free station
- “Access for All” – 10 year, €425m programme
- Step-free access at 148 stations
- Smaller schemes at 1300 other stations
- Intention to achieve 81% by 2015
Challenges United Kingdom Railway System

- Gaps / Steps - Staff intensive
- Old platforms used for mixed traffic
- Manual boarding ramps used at all heavy rail stations - Prevents independent access
Challenges

- “Harrington Hump” – prefabricated hump to raise low platforms at low use stations
- Does not give level access - Does not deal with horizontal gap
- Being fitted elsewhere

-> Anticipation in the Planning-Process of new Infrastructure
Staff assistance

- 24 hours notice requested
- Discourages infrequent travellers
- GB reluctant to move to automated devices
- 50% failure rate
- Funding for improved IT system
The ideal situation for enabling effectively working railway environment interfaces

- gap bridging systems for level-boarding
- Automatic bridge plates as used in
  - \( closed \) interoperable\(^*\) systems =
    - Same vehicle type (rolling stock\(^*\))
    - Same station-platform height throughout the infrastructure\(^*\)
  - \( improved \) passenger flow
  - \( Avoid \) Missing Links
  - \( increase \) number of irregular travellers
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The ideal Situation enabling effectively working Railway Environment Interfaces – speed up increase passenger turnover
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Best practice example ->

• E.g. Suisse Federal Railways
  Program “Mobihelfer”

  1 hour notice time only
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Best Practice Examples for Specialised Services

SNCF Accés+, RENFE Atendo, Barrierfreies Reisen Austrian Federal Railway ÖBB
Member states are able to classify projects in such a manner so as to locally manage the time and cost impact or requirements...

**Mechanism Project for Classification:**

**Directive 2008/57/EC** [...] enforces that a project that is Major must be assessed against the requirements of the PRM TSI by a Notified Body. Neither the UK or the Netherlands have yet used a Notified Body to assess the compliance of an infrastructure asset against the requirements of the PRM TSI.

**But** “Large Scale” projects have been classified as non-Major suggesting the need for certification of compliance by a NoBo is not necessary.

A number of reasons [...] managing the requirements at a local level. To limit the cost and process impact associated with involving a NoBo. To remove the need to apply to the EC for a deviation against requirements.
Accessibility for Public Transport Systems

The impact of the PRM TSI within the UK and Netherlands is limited due to existing national legislation and strategies:

- No new Rolling Stock has been introduced since the PRM TSI has been in force.
- Existing Rolling Stock is being upgraded in-line with mid-life refurbishment programmes. However, the level of compliance is restricted by structural design, hence targeted application of requirements is being used.

- Parliamentary Act passed which is designed to make railways accessible by 2030.
- PRM TSI used to provide design requirements.

<table>
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<th>Rolling Stock</th>
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<td>New Rolling Stock</td>
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<tr>
<td>- Manufacturers are standardising the incorporation of the PRM TSI and other requirements in their new modular designs.</td>
</tr>
<tr>
<td>- Few new projects introduced, hence minimal impact.</td>
</tr>
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</table>

<table>
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<th>Infrastructure</th>
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<tr>
<td>Member states have strong policy and standards</td>
</tr>
<tr>
<td>- UK has RVAR which has long promoted accessibility.</td>
</tr>
<tr>
<td>- UK and Netherlands both have national accessibility policy to develop their network.</td>
</tr>
<tr>
<td>Use of ‘Major’ classification is limiting the effect of the legislation [...]</td>
</tr>
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</table>

SOURCE: ERA Interim
TSI – PRM - Annex M

- Dimensions for wheelchair intended for indoor use.
- Mass limit of 200kg for combined mass of wheelchair and occupant and luggage.

-> prime example for non-harmonised Standards
Role of a wheelchair in transport

Interoperability of Norms?

- EN 12183 - Manual wheelchairs
- EN12184 – Power Wheelchairs
- Class A – Indoor, Class B - Indoor with outdoor capabilities Class C – Outdoor, with climbing ability Classified by operating environment – not by mass – Wheelchair selection/prescription according to user requirements vs. ->

- TSI – PRM. Annex M gives engineering limits for a transportable wheelchair & restricts access to Infrastructure & Stock for powered wheelchair users. proposed by European Disability CEN / TC256 WG 44 (Austria)

Picture: Pinzgauer Lokalbahn (Salzburger Landesbahn SLB), Austria
Wheelchairs – as seats in transport

- Primary function – to compensate for mobility impairment
- Transport Enables
  - Access to leisure, work & other facilities
- =Social Inclusion
  - Access to education
  - Design Priorities?
  - Toileting, - Comfort
  - Posture Management
  - Pressure Management
  - Tissue integrity

Source: B. Appleyard, British standard Institute, Chair Wheelchair Committee), International Consultant with BP[i]nternational CONSULT[i]ng
Thank You for your attention!

WILL & SKILL

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BPetutschn[i]g

Member
World Conference on Transport Research Studies – SIG Public Transport
CEN /TC 256 Working Group [TSI PRM – Accessible Rail Vehicles]

Assoc. Member
European Disability Form, Brussels
European Expert – European Certified Experts Associations