



accessible boarding for everyone – system overview, customer and operator needs



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accessibility

- Is a today's **must** for train and infrastructure **operators**
 - **Ethical question**; to allow everyone self-determination
 - **Regulations** (European and national regulations)
 - **Advantage** for all passengers and the train operator
 - easy boarding
 - shorter boarding time → punctuality
 - satisfied passengers

link vehicle - platform

- The link between the **platform** and the **vehicle** is an essential part regarding **accessibility** within the mobility chain.
- **Various different** and **individual** solutions do exist today in order to provide accessibility.
 - problem: **different** platform heights
 - variety of solutions → **expensive**

EU-project: Public Transportation – accessibility for all

- Project **founded** by EU with **FP7**
- **Goal:** Find a solution for improving the boarding situation
 - System integration into **existing coaches** as a feasible must
 - System shall be **standardized** for most existing coaches
 - System shall be used by **ALL mobility reduced** passengers
- **Consortium:**
 - *Coordinator:* Rodlauer Accessibility Consulting
 - *Universities* (Vienna University of Technology, University of Belgrade)
 - *Manufacturers* (MBB-Palfinger, Siemens Austria, Bombardier Transportation)
 - *Operators* (SBB, ÖBB, MAV, SZ, BDZ, NRIC, VBK)

People with Reduced Mobility (PRMs)

Physical (sensory) Impaired

- Wheelchair occupants
- Blind and visually impaired people
- Deaf and hearing impaired users

Travel impairments

- Luggage, pram, non locals

“Life Cycle” impairments

- Children
- Pregnant women
- elderly people

People with learning disabilities



Mobility reduced? – some further impressions



baby carriages
luggage

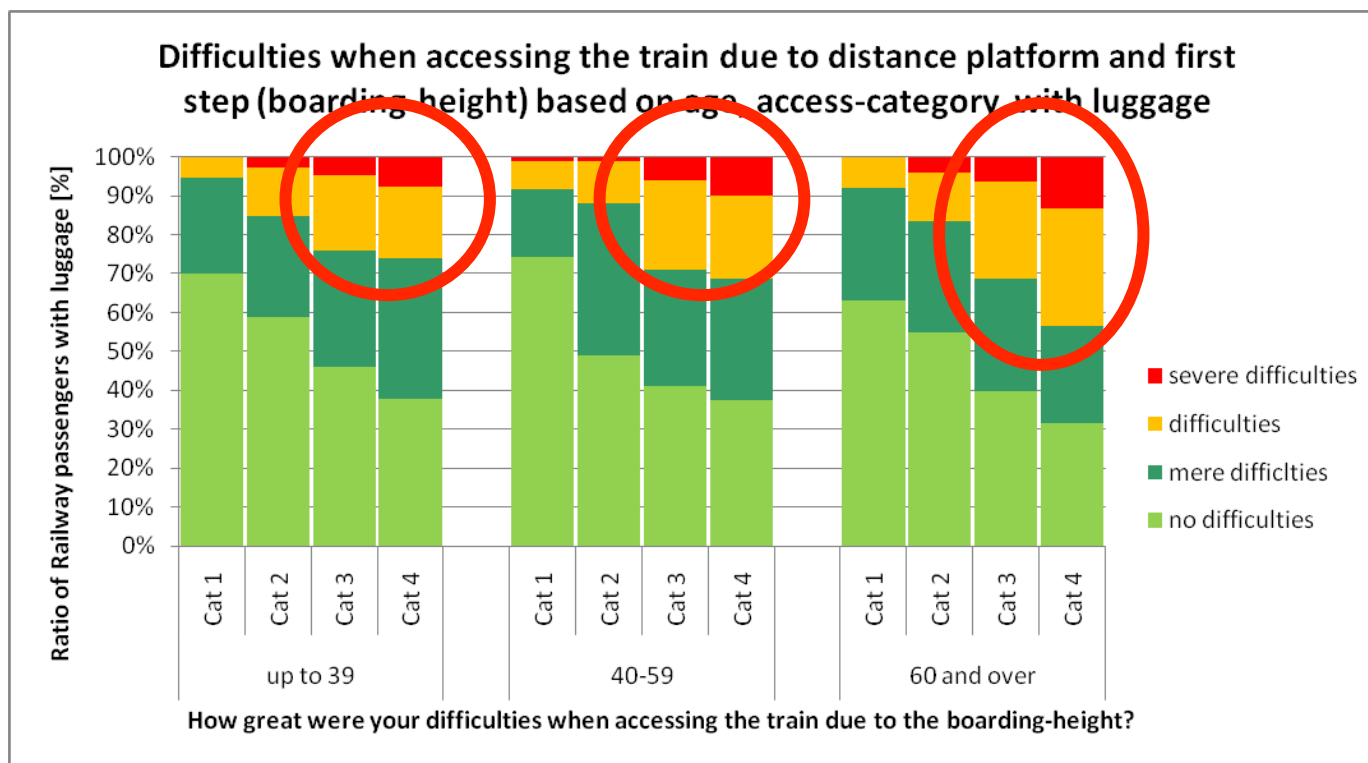


size (children)
elderly

Combination of difficulties!

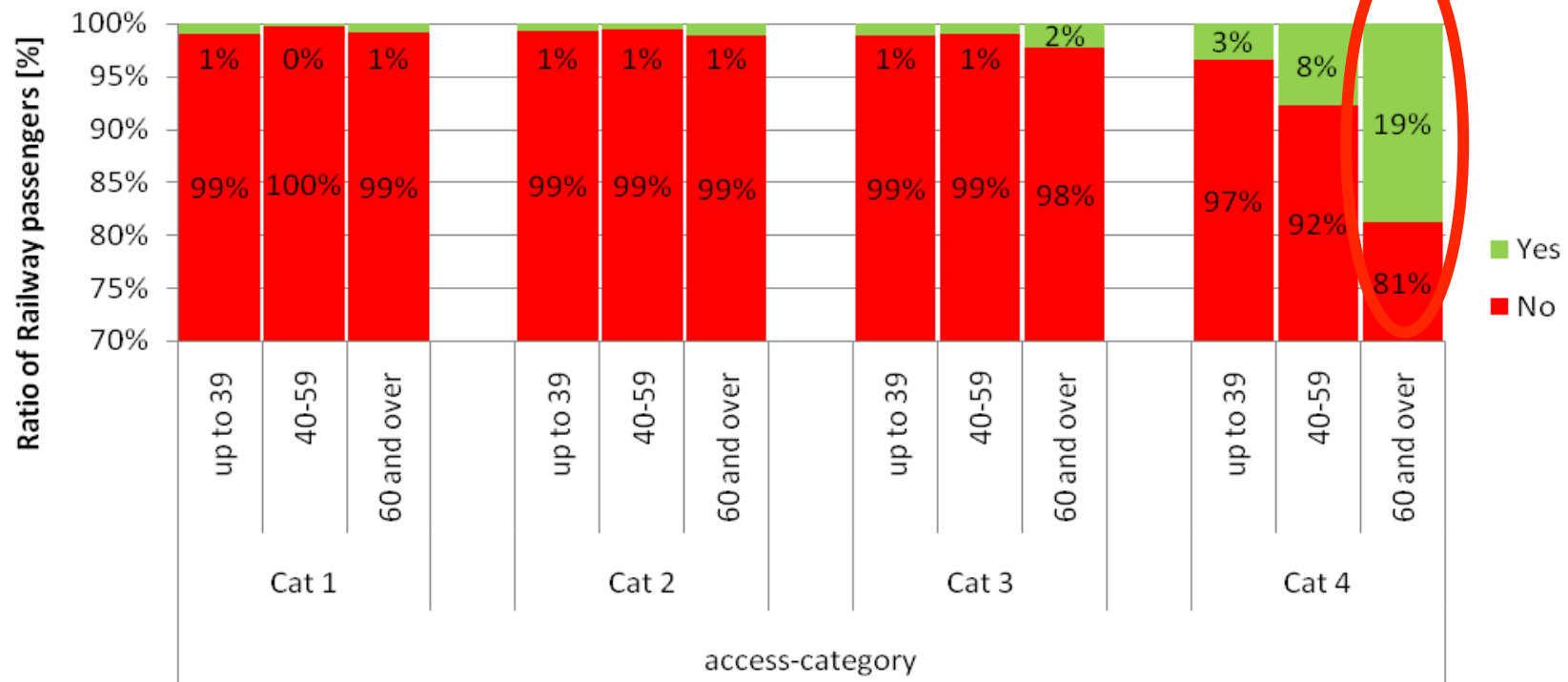
Difficulties when boarding

- Cat 1: level boarding or one step
- Cat 2: ICE, TGV etc.
- **Cat 3: typical passenger coach, 55cm platform**
- **Cat 4: Old passenger coach with steep entrance, low platform**



Personal assistance required when boarding:

Ratio of Railway Passengers requiring assistance with accessing the train based on access-category and age



Did you require personal assistance with accessing the train?

Cat 1: Level Boarding, one stair step max.

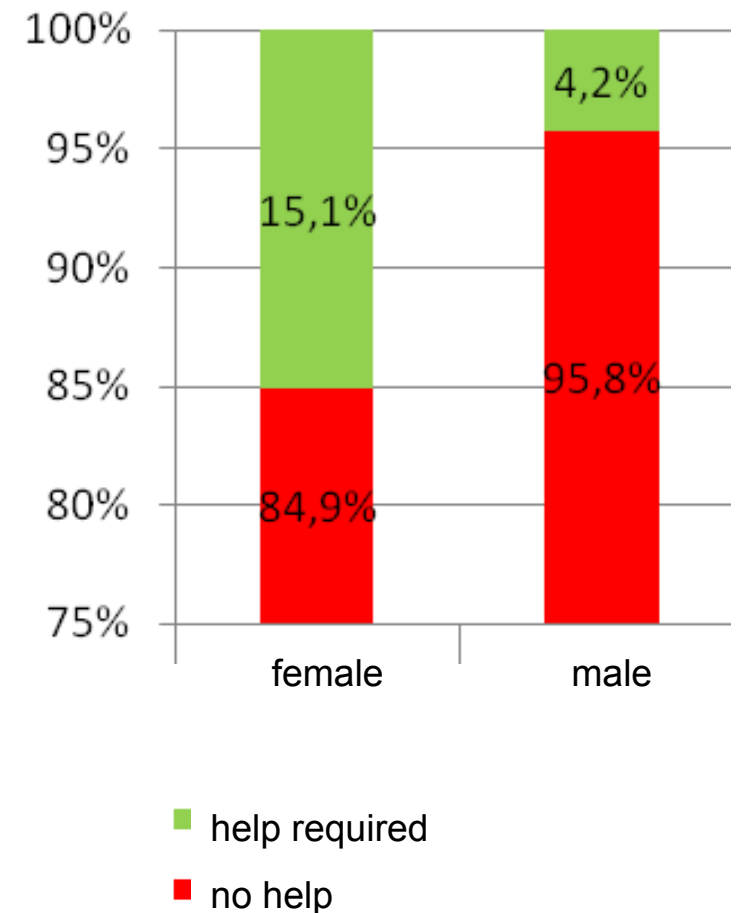
Cat 2: Access with two stairs

Cat 3: Access with RIC wagons 3 stairs from platform)

Cat 4: Old-type vehicle (3-4 stairs from platform)

With luggage: help required

- **Boarding with luggage: ca. 15% of female and ca. 4% of male passengers need assistance**



Boarding assistance device – for whom?

User with devices	wheelchair , walking frame	1-2
Physical impaired	Walking disabled, with crutch or sticks, elderly, diminutive people	2
User with special needs	Visual and hearing impaired	2-3
General passengers	Passengers with luggage, children, pregnant, baby prams	2-3

Score	Meaning
1	Very important – critical to successful operation (“must have”)
2	Important – high benefit for users and operators (“nice to have”)
3	Less important – some benefit for users and operators, but not absolutely necessary

Group of mobility reduced is very large

- **Most** long distance traveller are **mobility reduced**
- **Many** of them wish or actually need **assistance**
- Only a **small number** of them needs **technical assistance**
- For the **main part** of traveller easy handling equipment or **service** is enough to be satisfied
- In order to offer **accessibility to all** technical devices are necessary (e.g. for wheel chair user)

Needs of the operators

- **Easy** and **quick** handling
- **Reliability**
 - System must work when it is needed
 - Under all weather conditions (ice, snow, heat, dust etc.)
 - No extension of stopp time → punctuality
 - Good service for as many passengers as possible

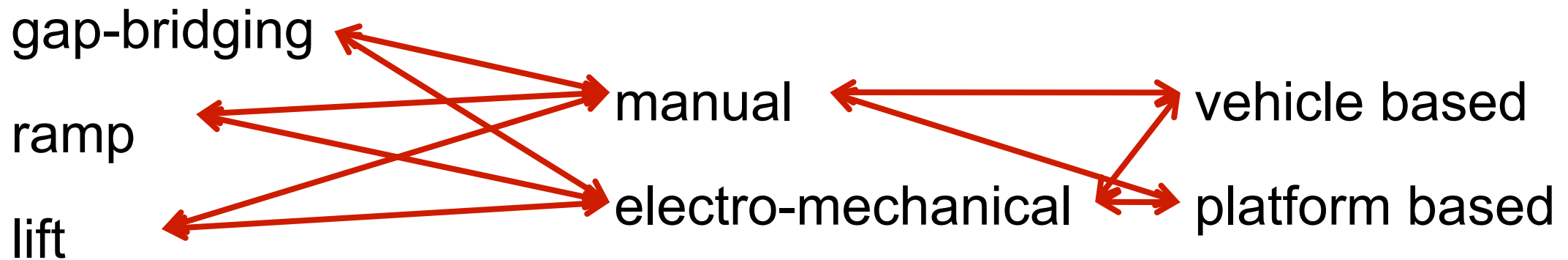
link vehicle - platform

- **level** boarding
- **steps** (high floor)

- In both cases a **horizontal** and usually a **vertical gap** remain that has to be bridged.



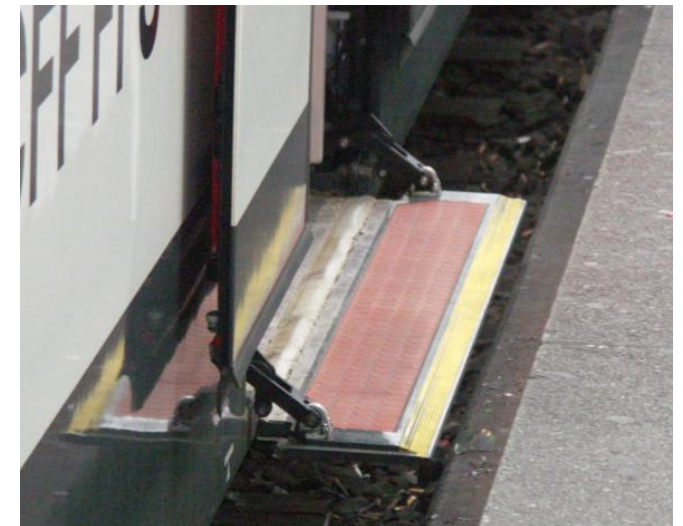
system overview



theoretically 12 combinations

gap bridging

- gap bridging
 - moveable step
 - hinged step
 - bumper strip
 - manuel ramp

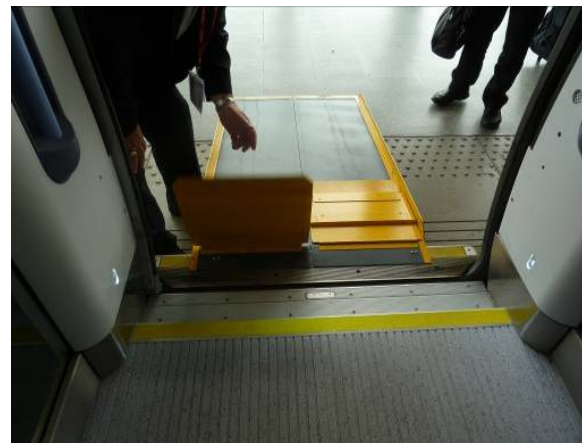


Ramps

- ramps
 - platform based
 - **vehicle based**



platform or vehicle based ramps - examples



- **Easy** to handle
- Useable by **everyone**
- Non slippery surface
- Only for **small height** difference
- Storage at platform and in vehicle

Ireland, U.K.

vehicle based ramps - example



Danmark/ DSB, Guldmann

platform based ramps - examples



- Parallel ramp around the corner
- Less problems with height and length
- Swivel base plate for wheel chair
- Quite difficult handling (folding, weight)

Norway, NSB; Belgium

ramps

- + relatively **easy** to handle
- + can be used by **everyone** (some operator in U.K. do that)
- + very good **reliability** (especial under extreme weather conditions)

- **Height difference** is limited
- Large height difference leads to a **long ramp** (max. angle 18%)
- Steep ramps can be dangerous

platform based lifts- examples



Denmark/DSB, France/SNCF, (Guldmann); Switzerland (Mirolit)

platform based lifts

- + relatively **easy** to handle (*problems in winter compared to ramps*)
- + **Height difference** is not limited (*but not downwards*)
- + **quick operation** (*if staff is used to operating lifts*)
- + - good **reliability** (*but more problems than ramps → especial under extreme weather conditions*)
- can **not** be used by **everyone** → usually only for wheel chair user

vehicle based lifts - examples



vehicle based lifts - examples



vehicle based lifts - examples



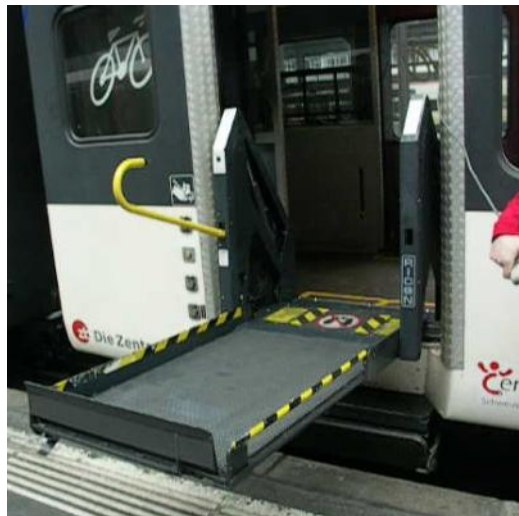
Norway/ NSB

vehicle based lifts - examples



Norway/ NSB

vehicle based lifts - examples



Switzerland/ Zentralbahn

vehicle based lifts - examples



Sweden, SJ

vehicle based lifts - examples



Sweden, SJ

vehicle based lifts - examples



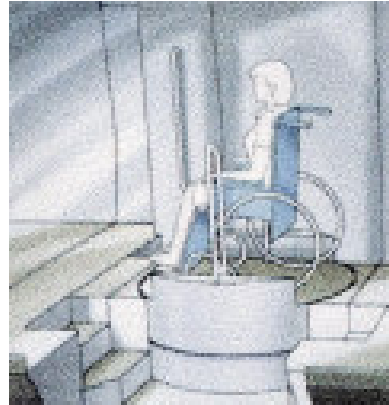
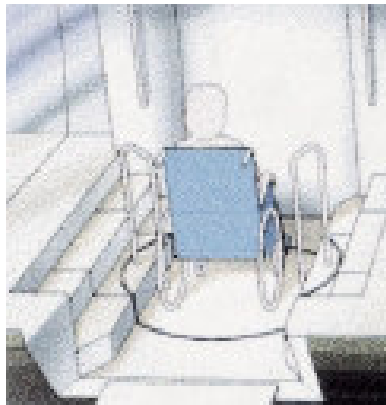
ÖBB-railjet, MBB-Palfinger

vehicle based lifts

- + **Operators are independent** from infrastructure
- + **Height difference** is not limited
- + **Reliability** (*depends on the condition*)
- Can **not** be used by **everyone** → usually only for wheel chair user
- **Operation** needs a **long** time, **complicate** to handle
- Entrance is **blocked**

Boarding assistance devices

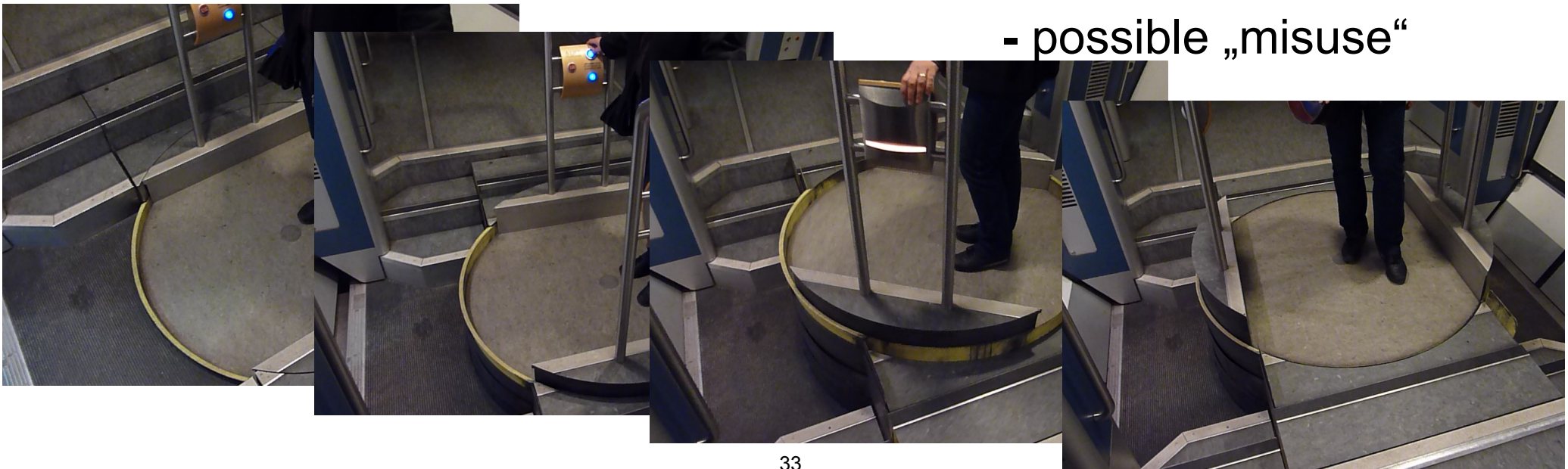
- Lifts (or ramps): only for wheelchair occupants
- Exemption, example:
Regina train in Sweden



Lift – Regina train in Sweden

- Lift can be operated by ALL passengers by THEMSELVES

- + simultaneously boarding by other passengers
- + independent use
- + also for baby prams
- entrance → only for 55cm
- possible „misuse“



experience – needs: operator

- Many **different** needs and experiences of operator
- Technical system: regular problems in **winter** period
- Majority of operator prefers **vehicle** based systems
- „the **simpler** the better“
- Especially for **UIC-cars** (entrance door with 80cm) a technical solution has to be developed

Service for everyone

- Many passengers need or wish to get help
 - Handicapped, baby prams, luggage, elderly etc.
- Technical assistance is required only for a very small group
 - Wheel chair user, some heavily walking disabled

Ramps can provide accessibility for everyone (in some cases)

Lifts can only provide accessibility to a very small group

Service for everyone

- **Personnel assistance** at the station or at the vehicle entrance
 - **Quick** and **easy** assistance **for everyone** who wants help
 - E.g. for passengers with luggage or baby prams
 - No technical equipment required, no problems with punctual train operation
- **Examples:**
 - Service Accès Plus of SNCF (France)
 - Service Atendo (“I am awaiting you”) – Service of RENFE (Spain)

Service Atendo

- ❑ Special service at the station for everyone
- ❑ Significant colour: orange → easy to find
- ❑ Help desk at the station close to the entrance



Service Atendo

- Staff serves devices like lifts
- Staff gives assistance to everyone who wants
- Assistance in the station, while boarding and for finding a seat



- Only a small group of passengers needs technical devices
- **Platform based** lifts and ramps are **liked** by passengers and operator
 - **Lifts** can **only** be used for **wheel chair** user / **Ramps** also by others
 - **Ramps** are **easy to handle** and always work under extreme weather conditions
 - **Platform** based systems can be operated **much quicker** than **vehicle** based
- **But: Vehicle based** systems give **independence** from the infrastructure
- **Most difficulties:** UIC waggons (entrance at the end, 80cm door width)
- Additionally **personnel service** must be offered at the vehicle entrance
 - **Quick** help and assistance **for everyone**
 - Service leads to satisfied customers

Thank you for your attention

Questions to:

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