

'Fire Safety for All' in Buildings

Detailed Aspects

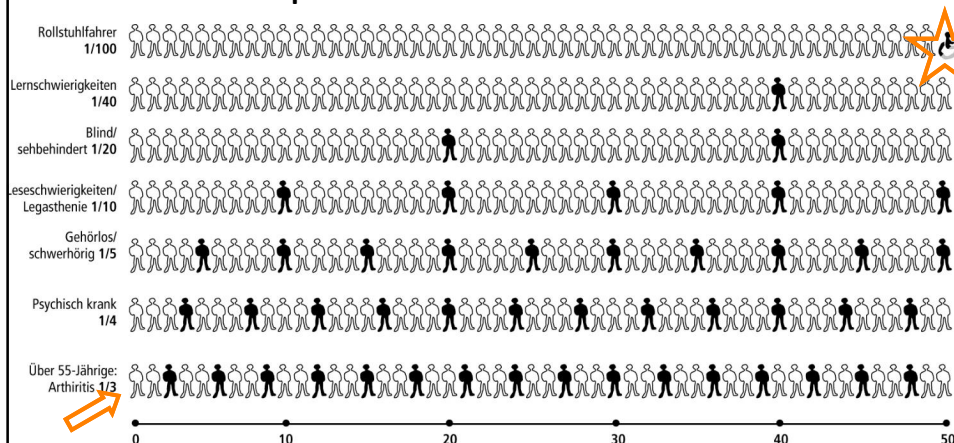
Monika Anna Klenovec

Architect, DI + Access Consultant + Univ.-Lecturer



Fire Safety for All – Reboot & Reload! – 9 & 10 April 2015, Dublin/Ireland

Fire safety for all - not “only” important for persons in wheelchairs!



Quelle: Prof. Keith Bright, Reading University; RNIB; RNID; (UK), Deutscher Schwerhörigenbund, 2005

EU Legislation ...

- **Non-discrimination clause** (art.6a) based on disability and age of the EU Treaty of Amsterdam
- **UN Convention on the Rights of Persons with Disabilities** – “human diversity, social inclusion and equality for all” – ratified by EU and all European Member States since 2008
 - **Human Rights principles:** „Accessibility“ for free movement, free choice of housing and work, leisure and culture
- **EU Disability Strategy 2010 to 2020:**
 - **Public procurement Directive** (Design for all - Concept)
 - **Construction Products Regulation (CPR) 305/2011** with the main essential characteristics (including safety and accessibility)
 - **EU Lift Directive** for lifts & **EU Machinery Directive** for platform lifts

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European Mandates on accessibility...

- **M/420 Accessibility for public procurement in the built environment** (Phase I finished, Phase II before start)
- **M/473 Design for all** to include accessibility following the “Design for All” approach in mainstream standards;
- **M/283 Guidance in the field of consumer safety and usability of products** with barrier-free design, enabling the use of products by disabled and elderly people -applying the principles of design for all, adaptable design and assistive technology;
- **M/293 Guidance in the field of safety of consumers and children** – child safety

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EU Construction Products Regulation (CPR)

ANNEX I, BASIC REQUIREMENTS FOR CONSTRUCTION WORKS

Construction works as a whole and in their separate parts **must be fit for their intended use**, taking into account in particular the **health and safety of persons involved** throughout the life cycle of the works. Subject to normal maintenance, construction works must satisfy these basic requirements for construction works for an economically reasonable working life.

Basic requirements:

- | | |
|---|---|
| 1. Mechanical resistance and stability | 5. Protection against noise |
| 2. Safety in case of fire | 6. Energy economy and heat retention |
| 3. Hygiene, health and the environment | 7. Sustainable use of natural resources |
| 4. Safety and accessibility in use | |

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CPR – Annex I „BASIC REQUIREMENTS FOR CONSTRUCTION WORKS“ in case of „Fire Safety“

2. Safety in case of fire

The construction works must be designed and built in such a way that in the event of an outbreak of fire ...

- the load-bearing capacity of the construction can be assumed for a specific period of time;
- the generation and spread of fire and smoke within the construction works are limited;
- the spread of fire to neighbouring construction works is limited;
- occupants can leave the construction works or be rescued by other means;
- the safety of rescue teams is taken into consideration

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CPR – Annex I „BASIC REQUIREMENTS FOR CONSTRUCTION WORKS“ in case of „Accessibility and use for disabled persons“

4. Safety and accessibility in use

The construction works must be designed and built in such a way that they do not present unacceptable risks of accidents or damage in service or in operation such as slipping, falling, collision, burns, electrocution, injury from explosion and burglaries.

In particular, construction works must be designed and built taking into consideration accessibility and use for disabled persons.

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Fire safety issues and tourism – Failure of the HOTREC Initiative 2011

ANEC's view: **self-regulation is not effective enough in fire safety area** – see failure of the HOTREC Initiative on fire safety requirements for hotels 2011.

ANEC's call for a **European Directive identifying essential safety requirements**.

Commissioner Dalli announced 2011 that the Council Recommendation 86/666/EEC on fire safety in hotels will be revised.

 next step: **Green Paper Questionnaire 2014**

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European Commission – COM

Green paper on safety of Tourism Services

- **Green paper on the safety of Tourism Accommodation Services**
 - Consultation (July-November 2014) among EU countries , SMEs and stakeholders **covered safety aspects beyond fire safety as:**
 - carbon monoxide safety
 - safety of balconies,
 - hotel rooms,
 - glass doors,
 - and cross-cutting aspects addressed include ,accessibility and vulnerable consumers' and ,data on injury and accidents'

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European Commission – COM

Green paper on safety of Tourism Services

- Questionnaire aimed at evaluating five aspects:
 - 1) Are the existing instruments and their implementation adequate and sufficient?
 - 2) Measuring the nature and extent of the safety risks and their link to gaps in the current legislative framework.
 - 3) To what extent they have an impact on the provision of such services across borders?
 - 4) To what extent they have an impact on SMEs and vulnerable consumers?
 - 5) In order to make a clear distinction of what objectives are best met at which level

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European Commission – COM

Green paper on safety of Tourism Services

- **Accessibility and vulnerable consumers (ANEC):**

- reiterated ANEC (European voice of consumers in standards) standpoints and requests on accessibility in tourism:

- training on disability awareness requirements
- information requirements
- promotion of ANEC design for All activities and usefulness of Guide 6 on accessibility in standards and
- ANEC Position Paper: How standardization can support the silver economy: **Wiser standards for an ageing world!**

EC COM to issue summary of responses collected and possible **next steps in April 2015**: draft ANNEX 1 (see EC green paper)

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Other European Activities on Fire Safety

„Is Europe Playing with Fire?

A Call to Action on Fire Safety in Buildings“

- 24 February 2015 in Brussels, by the coalition Fire Safe Europe (FSEU) coalition mainly composed of industries in the area of building products.
- **Construction Product Regulation (CPR):** main target for inclusion of **improved requirements for fire safety** in buildings.

The debate of the meeting with a wider range of stakeholders showed **a need for more balanced and comprehensive approach taking into account existing initiatives for the improvement of fire safety in buildings.**

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EC Tourism policy – DG GROW

- **‘Economic impact and travel patterns of accessible tourism in Europe’**
 - Examines the demand for accessible tourism by assessing its economic impact, as well as the demographic evolution and travel patterns of **travelers with special access needs.**
- **‘Mapping the skills and training needs to improve accessibility in tourism services’**
 - Appraises the skills and competences needed by staff employed in tourism (see M. Klenovec **DfA-research study on accessibility training and access consulting**: this is also a **‘missing link’ in training and education of architects, site developers etc. in building construction!**)
- **Future key area: Finalization of European Charter for Sustainable and Responsible Tourism**

“There is a need to emphasize social impacts, accessibility references as well as safety aspects”

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EU Lift Directive – considering also persons with disabilities? – Yes! - But not always in practice!

1.2. Carrier

The carrier of each lift must be a car. This car must be designed and constructed to offer the space and strength corresponding to the maximum number of persons and the rated load of the lift set by the installer.

Where the lift is intended for the transport of persons, and where its dimensions permit, the car must be designed and constructed in such a way that its structural features do not obstruct or impede **access and use by disabled persons** and so as to allow any appropriate adjustments intended to facilitate its use by them.

1.6. Controls

1.6.1. The controls of lifts **intended for use by unaccompanied disabled persons** must be designed and located accordingly.

1.6.2. The function of the controls must be clearly indicated.

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ENh Standards for Lifts for Persons

„h“ = harmonised standard
(listed in EC Official Journal)

- **ENh 81-20** Safety rules for the **construction** and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts– (supersedes EN 81-1 and -2) = **harmonized standard**
- **ENh 81-28** Remote alarm on passenger and goods passenger lifts



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EN application standards for lifts for persons

Accessibility for lifts for persons

ENh 81-70 Particular applications for passenger and goods passenger lifts - Part 70: Accessibility to lifts for persons including persons with disabilities

= Particular application standard for buildings where accessibility is required per national law!

➡ But often not applied in building practice!

Firefighters lifts

ENh 81-72:2003 Particular applications for passenger and goods passenger lifts - Part 72: Firefighters lifts

Evacuation lifts

CEN/TS 81-76:2011

Particular applications for passengers and goods passenger lifts. Evacuation of disabled persons using lifts with assistance



Diese Kennzeichnung sollte über dem Bedienknopf des Aufzuges angebracht werden. Bild: © Schwarz Brandschutz



Designation example of an evacuation lift
Foto: © Schwarz Brandschutz

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EN 81-70 – basic requirements for lift cars and controls

0.4 Negotiations

It is assumed that negotiations have been made for each contract between the customer and the supplier/installer about:

- a) the intended use of the lift;
- b) temporary activation of features of the lift;

➡ a), b) could be interpreted in a false direction!!!

Table 1 — Minimum car dimensions for cars with a single entrance or two opposite entrances

Type of lift	Minimum car dimensions ^a	Accessibility level	Remarks
1	450 kg Car width : 1 000 mm Car depth : 1 250 mm	This car accommodates one wheelchair user.	Type 1 ensures accessibility to persons using a manual wheelchair described in EN 12183 or electrically powered wheelchair of class A described in EN 12184.
2	630 kg Car width : 1 100 mm Car depth : 1 400 mm	This car accommodates one wheelchair user and an accompanying person.	Type 2 ensures accessibility to persons using a manual wheelchair described in EN 12183 or an electrically powered wheelchair of class A, B or C described in EN 12184. Class B wheelchairs are intended for some indoor environments and capable of navigating some outdoor obstacles.
3	1 275 kg Car width : 2 000 mm Car depth : 1 400 mm	This car accommodates one wheelchair user and several other users. It also allows a wheelchair to be rotated in the car.	Type 3 ensures accessibility to persons using a manual wheelchair described in EN 12183 or an electrically powered wheelchair of class A, B or C described in EN 12184. Class C wheelchairs are not necessarily intended for indoor use but are capable of travelling over longer distances and navigating outdoor obstacles. Type 3 provides sufficient turning space for persons using wheelchairs of class A or B and walking aids (walking frames, rollators etc.).

^a Car width is the horizontal distance between the inner surface of the structural walls, measured parallel to the front entrance.
Car depth is the horizontal distance between the inner surface of the structural walls, measured perpendicular to the width.

only for refurbishment in existing buildings – not accessible for electrical powered wheelchairs

Another larger lift car size will be added!

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EN 81-70 – basic requirements for accessible controls

Car and landing controls - Requirements:

- min. area 490 mm²
- min. dimensions 20 mm
- identification of active part of buttons: **visually** (by contrast) and **tactile** (0,8 mm by relief)
- Identification of face plate: color to contrast to its surrounds
- operating feedback: visible and audible
- operating force
- registration feedback
- min. height 900 mm
- max. height 1200 mm (1100 mm preferably)
- min. lateral distance of any button of adjacent walls: 400 mm for car controls (500 mm for landing controls)

Table 2 — Control devices - Requirements

#	Subject	Landing controls	Car controls
a)	Minimum area of active part of buttons		490 mm ²
b)	Minimum dimension of active part of buttons		Inscribed circle with a diameter of 20 mm
c)	Identification of active part of buttons	identifiable visually (by contrast) and by touch (relief) from face plate or surrounds	
d)	Identification of face plate	colour to contrast to its surrounds (see D.2)	
e)	Operating force		2,5 N to 5,0 N
f)	Operating feedback	required to inform user that the button, once pushed, has operated	
g)	Registration feedback	Visible and audible, adjustable between 35 dB(A) and 65 dB(A) ^b . The audible signal shall be given on every individual operation of button even if the call is already registered.	
h)	Button for building exit floor	Not applicable	Protrudes (5 ± 1) mm beyond the other buttons (preferably green)
i)	Position of symbol		on active part (or 10 mm to 15 mm left of it)
j)	Symbol		In relief contrasted to the background, 15 mm to 40 mm high
k)	Height of relief		Minimum 0,8 mm
l)	Distance between active parts of buttons.		Minimum 10 mm
m)	Distance between group of call buttons and other group of buttons ^a	Not applicable	Minimum twice the distance between active parts of call buttons
n)	Minimum height between the floor level and the centreline of any button		900 mm
o)	Maximum height between the floor level and the centreline of the highest button	1 100 mm	1 200 mm (preferably 1 100mm)
p)	Arrangement of buttons	vertical	See 5.4.2.2
q)	Minimum lateral distance between the centreline of any button to any corner of adjacent walls.	500 mm	400 mm

^a e.g. between alarm-/ door buttons and call buttons.

^b Adjustable between limits for adaptation to environmental conditions.

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Experiences with EN 81-70

Requirements of EN 81-70 are not applied in practice – although it is a harmonised European standard (listed in the EC Official Journal):

5.4.4.2 When the car stops, a voice in at least one of the official local languages shall announce the car position.

Even in buildings where high performance in accessibility is required (residence for elderly people) this requirement is often not applied.

Upgrade of the installation with acoustic announcement is not possible in most cases (low price lift control does not allow it).

Need for action:

This problem seems to be in relation with clause 04. Negotiations and has to be clarified during revision!

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Experiences with EN 81-70 touch-sensitive panel = not accessible

5.4.2 Car control devices

5.4.2.2 Car buttons shall meet the requirements in table 2.

*Several times a year accessibility consultants and mobility trainers have to intervene due to installment of **touch-sensitive panels** which are not accessible for vision impaired and blind people.*

This happens in buildings where accessibility is required due to the building law within the EU member states. Very often in residential buildings but also in buildings accessible to the public like commercial buildings with medical or therapist practices, law offices etc.

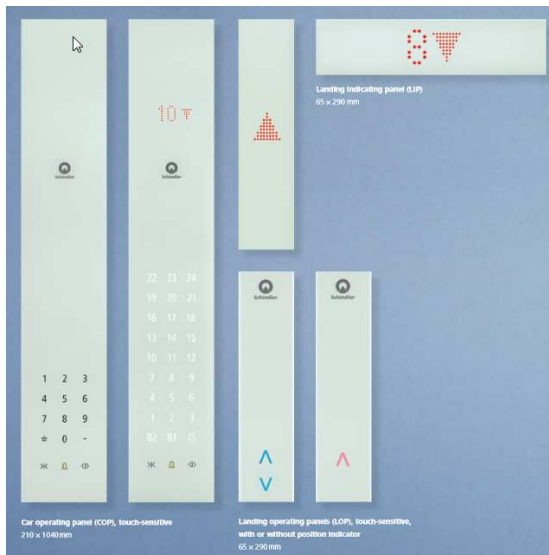
Planning process and building permit:

in this phase no information about the controls of the lift panel is known, the intended users of commercial buildings are often not clear, the rooms are not yet rent. After building execution no further checks are made.

Need for action: Clarification in 04. Negotiations how to proceed when the users are not yet defined!

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Touch-sensitive panel – low visibility and contrast, not touchable = NOT accessible!!!



How will you find the designated floor if you are blind?

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Less visual detection!!!
No contrast!!!



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Avoid also reflections, reflexes and glare ...

Glare and reflections on controls should be avoided!

Reflecting surfaces (like chrome) shall not be used neither for symbols and characters nor for their background!



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Lift panels with appropriate contrast!

Appropriate contrast between characters and their background

Proposed alternative texts:
Symbols and characters are black on a white or white on a black background.



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Symbols for reliable Information for hearing impaired persons:



- To indicate that the alarm has been set



2-way communication:

- To indicate the announcement coming from the emergency call center



- If a display is installed it shows: „please speak“

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Revision of EN 81-70 – Public Enquiry for 3 months this summer!

- Enquiry phase is shortened to 3 months!
- Check carefully the text of this revised standard!
- NEW: **Touch-screen application** for destination control systems in special buildings with customized users only!
- For public buildings only visually and tactile controls (according table 2) + keypad system!
- Plan, order and install only accessible lifts according EN 81-70 + EN 81-20 in line with your building regulation where accessible buildings are required by law!

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Austrian approach on fire safety for all

According ÖNORM B 1600

- **Evacuation plan** integrated in the fire protection plan with safe evacuation routes for all – independent evacuation to a “place of safety” is main design criteria
- different classes (levels) of evacuation defined according the intended use of the building and the numbers of persons involved
- safe evacuation routes for all (fire doors with independent electrical power supply if automatic doors between fire protection areas)
- Waiting areas = ‘**places of (relative) safety**’ in the evacuation staircase with special requirements (or in an separate fire protected room) for people who need rescue assistance
- Evacuation lifts (similar to firefighter lifts)
- Dislocation of people in other horizontal fire department sectors with a safe evacuation route to a ‘**place of safety**’ outside of the building
- Two sense principle for all information and guidance on the evacuation routes



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Fire evacuation – the Austrian approach

ÖNORM B 1600

Different possibilities of secure evacuation and emergency routes:

- **Lifts, similar as firefighters lifts** or evacuation lifts (with assistance)
- **Dislocation of people in other fire compartments** (mainly horizontally) where a secure evacuation route (e.g. stairs, ramps) to a “place of safety” exists
- Waiting areas at floor landings of evacuation staircases – ‘**place of relative safety**’ - or on evacuation balconies within an evacuation route leading to a ‘**place of safety**’ outside the building



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Fire evacuation – the Austrian approach

Persons are considered with

- age-related, mobility and sensual impairments
- cognitive impairments
- reduced reaction rate

3 Categories of persons depending on their familiarity with the place

Category A: where predominantly persons familiar with the place are staying (e.g. office buildings, residential houses, schools, kindergarten)

Category B: where non-local visitors and persons familiar with the place are staying (e.g. administration buildings with clients, provider/shops of services) and all others not falling under category A or C

Category C: where mainly non-local visitors are staying (e.g. tourism facilities, shops, event locations, hospitals)

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Fire evacuation – the Austrian approach

Main Principles of evacuation:

- Evacuation classes:
- to set the alarm
- Guiding (provide information)
- (relative) Place of safety
- 2-sense principle: acoustic information also visual / visual information acoustically or tactile

Evacuation classes

Categories of people familiar with the place	Number of people who are usually staying in the building			
	≤ 20 people	21 - 120	121 - 240	more than 240
Category A	evacuation classes	evacuation class II	evacuation class III	evacuation class VI
Category B		evacuation class III	evacuation class IV	
Category C		evacuation class IV	evacuation class V	

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ÖNORM B 1603 Accessible Tourism Facilities

Annex A (normative) - Places of Safety

Requirements for 'Places of Safety' (= area of rescue assistance):

- the entrance and all areas of an evacuation route shall be accessible,
- the foot print for one wheelchair place is minimum 90 cm x 120 cm, more than 2 places min. 80 cm x 120 cm per wheelchair place,
- means of communication at least according EN 81-70:2005, 5.4.4.3,
- all controls, buttons and communication means have to be accessible according ÖNORM B 1600:2013, clause 8.1,
 - emergency/evacuation route lighting,
 - smoke and heat venting system,
 - Independent means of communication (2-senses principle)
 - tactile designation of space, floor acc. ÖNORM V 2105,
 - signage/lettering of the 'place of safety' (see sign above),
- space of life saving appliances (e.g. life net, stretcher, smoke mask) for rescue assistance and evacuation of people with disabilities
- Each dwelling is understood as a 'place of safety' in the building regulation!



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ÖNORM B 1603 Accessible Tourism Facilities

Annex A - Places of Safety

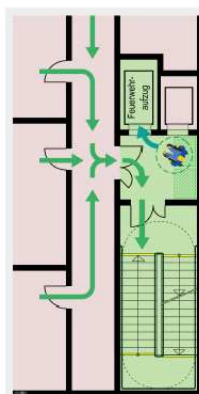


Bild A.1a —
Sicherer Verweilbereich
zwischen Feuerwehraufzug und
Fluchttreppenhaus

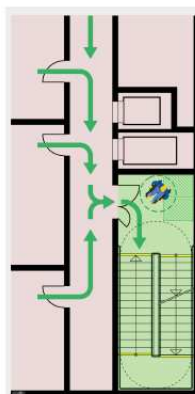


Bild A.1b —
Sicherer Verweilbereich im
ausreichend großen Flucht-
treppenhaus

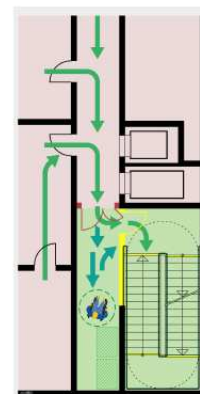


Bild A.1c —
Erweiterung des Fluchttreppen-
hauses mit einem sicheren
Verweilbereich

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ISO 21542 –

Fire Safety for all in buildings - detailed aspects

**Relevant building details - „Fire Safety for all“ aspects
= guidance/harmonization for national standardization:**

- ☐ **unobstructed free width** of ramps, stairs, doors, lift doors, manoeuvring space etc.
- ☐ **operating force of doors:** fire protection doors a critical challenge!
- ☐ **Self-rescue with pressure aeration systems**
- ☐ **2-sense-principle** for all important information in an emergency case for fire alarm: tactile, visual contrasting and/or audible!
- ☐ **contrast and tactile guidance** for evacuation especially for persons with visual impairments to a place of safety,
- ☐ **Fire alarm devices:** smoke alarms, sprinkler or high-pressure water mist systems, evacuation chair, communication point, luminance guidance devices for the evacuation route etc.
- ☐ **Fire evacuation plan/concept**
- ☐ **Management issues, skills and training**

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ISO 21542 –

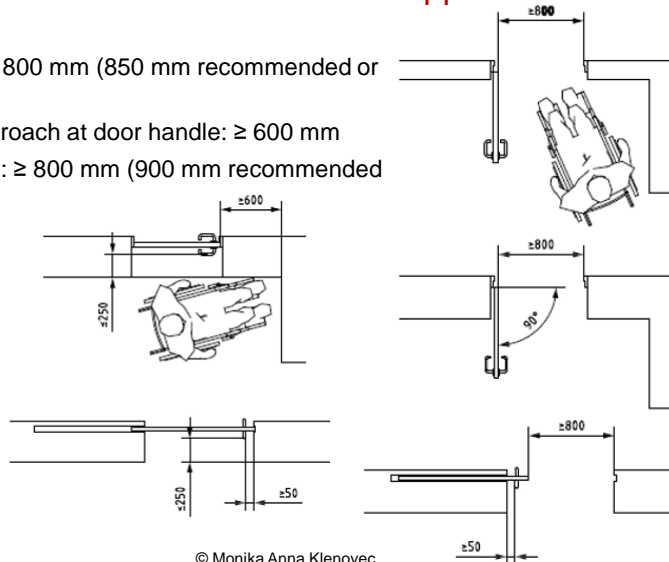
Unobstructed free width – a harmonised approach!

- ramps: ≥ 1200 mm (between handrails min. 1000 mm)
- stairs: ≥ 1200 mm (width between handrails ≥ 1000 mm)
- evacuation stairs: min. 1500 mm width for use with evacuation chair (excl. handrails)
- flight of stairs: ≥ 1700 mm (between handrails 1500 mm)
- staircase landings: ≥ 1500 mm length
- internal passages: ≥ 1200 mm – 1800 mm
- manoeuvring space = landings: ≥ 1500 mm diameter
- unobstructed manoeuvring space in lobbies: ≥ 1500 mm

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ISO 21542 – free width of doors – a harmonised approach!

- doors: ≥ 800 mm (850 mm recommended or more)
- side approach at door handle: ≥ 600 mm
- lift doors: ≥ 800 mm (900 mm recommended or more)



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ISO 21542 - Stairs

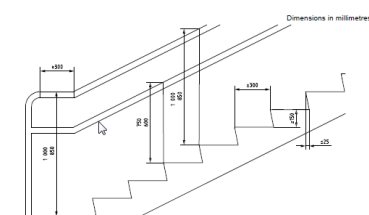
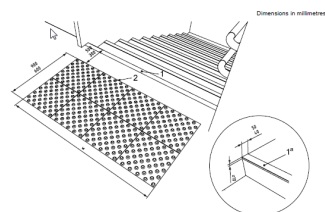


Figure 16 — Recommended going and rise of steps



Key
1. visual warning line
2. tactile warning surface indicator with max. height of pattern 5 mm
w. full width of stairs
* Preferred option. Not a requirement.

Figure 19 — Tactile walking surface indicator (TWS) and visual indicator

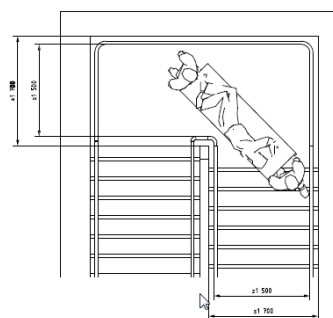


Figure 17 — Example of stair and 180° landing for emergency access

ÖNORM B 1600

stairs, steps and continuing handrails

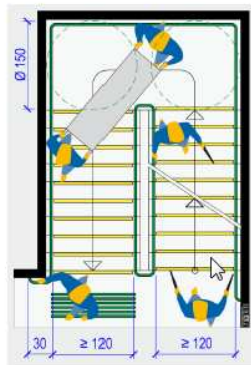


Bild 7a — Lichte Treppenbreite

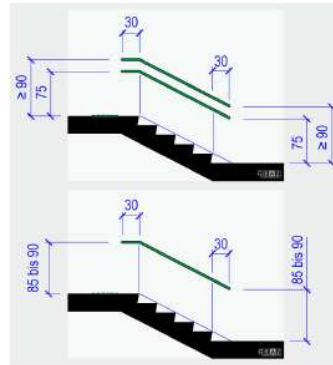


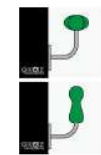
Bild 7b — Handlauf



richtige Handlaufbefestigung



falsche Handlaufbefestigung



richtige Handlaufprofile



falsche Handlaufprofile

Bild 7c — Handlaufdetails

Bild 7 — Treppen – Handläufe (Maße in cm)

ÖNORM B 1600

Marking of downgoing stairs/steps, attention pattern

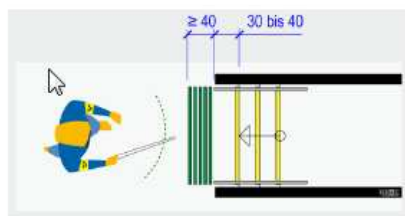


Bild 8a — Vor gefährlichen Treppenabgängen

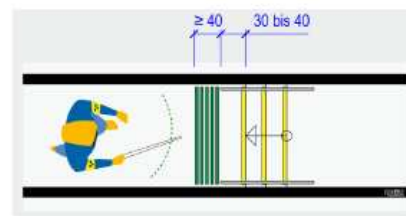
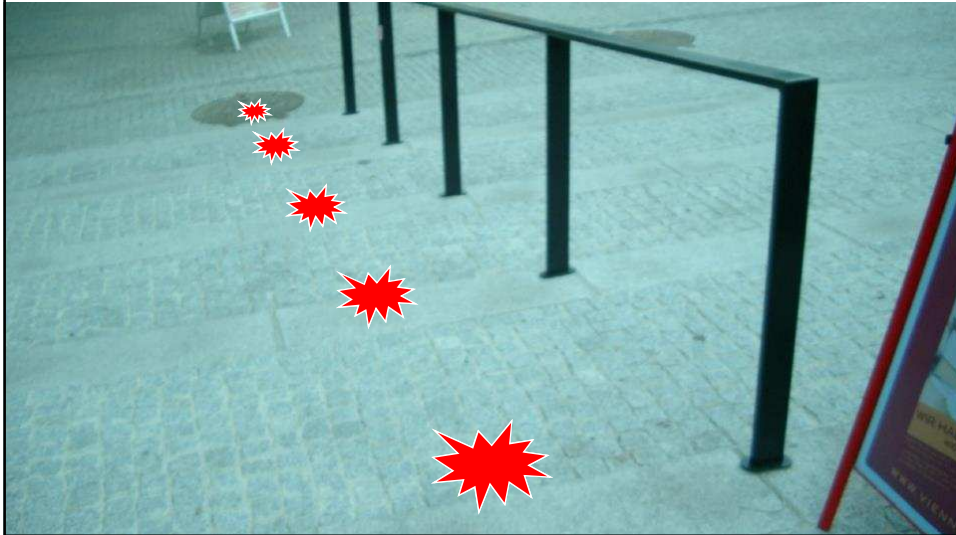


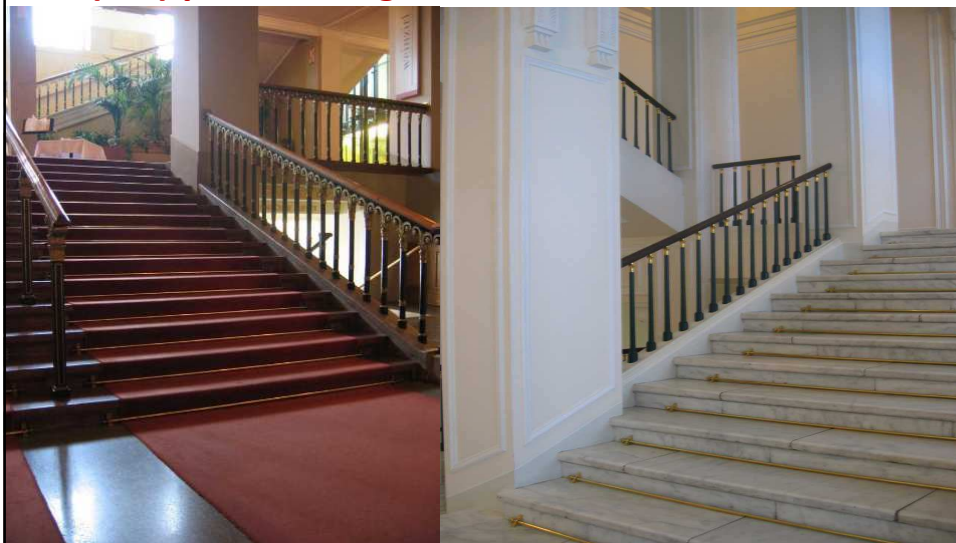
Bild 8b — Vor Treppenabgängen im Gang

Bild 8 — Aufmerksamkeitsfeld (Maße in cm)

(-) Invisible steps ... Safe and ergonomic handrail?



**Konzerthaus/Vienna –
(-/+) protection guardrail instead of handrails?**



(-) Albertina Museum – where are the handrails?



Underground: Marking of stairs, large controls (+)



Tactile Guiding - Example Bank Austria (+)

ÖNORM V 2102-1

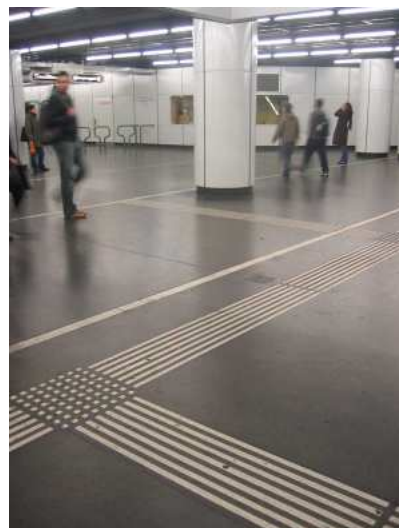


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Tactile Guiding – Usability and Accessibility (+)

Tactile visual guiding system in underground stations, railway stations and streets outside area metc.

∴



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Information for All is important! ,2-sense principle': visually contrasting + tactile



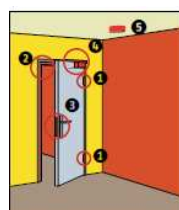
↑ Only usable for blind people
– less usable for visually impaired!

„readable“ for All
with good contrast →



Operating force of door: independent self-evacuation?

Max. operating force of doors: $\leq 25 \text{ N}$, otherwise automatic powered door closer!
different door closers:



Mechanischer Türschließer
mechanical



Freilauftürschließer
semiautomatic (free-wheel, locking device)



Feststelltürschließer



Automatische Tür



Tür mit Servoantrieb

- **mechanical:** accessible everyday + in case of fire
- **semiautomatic:** accessible everyday but in case of fire - higher closing forces (more than 25 N)!
- **automatic door closer:** fully accessible with **emergency power supply for self-evacuation!**

Graphiken: Infoblatt Stadt Graz, barrierefreier Brandschutz, Oskar Kalamidas

Self-rescue with pressure aeration systems!

- 3 smoke alarm
- 4 fire alarm push button
- 5 automatic door with emergency power supply
- 6 evacuation lift (similar to firefighters lift) with suitable protection for safe evacuation for all persons including person with disabilities

Function: fresh air is blown in the evacuation staircase and keeps the evacuation lift and staircase smoke-free!



Graphik: Infoblatt Stadt Graz, barrierefreier Brandschutz, Oskar Kalamidas

ISO 21542 - Two-sense principle

Supportive measures for information and wayfinding shall be provided for people with sensory impairments according to the principle of two senses:

- ☐ Audible/tactile information for people with vision impairment
- ☐ Visual information for people with hearing impairment (and vibration alarm)

ISO 21542

Color concept, contrasts, tactile guidance for evacuation

- ❑ Color concept for contrast to improve orientation
- ❑ Tactile guidance on handrails, walls in direction of evacuation



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Fire alarm devices etc.

- smoke alarms!!!
- sprinkler system or high-pressure water mist systems
- visual and acoustic alarm device
- tactile guiding systems



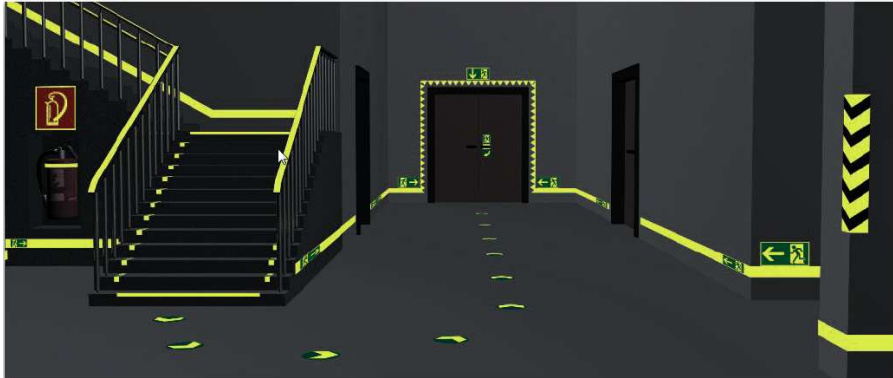
Equipment in 'relative places of safety':

- smoke masks
- evacuation chair,
- emergency call for communication (independent functioning),
- luminance guidance devices for the evacuation route etc.
- stretcher
- tactile information etc.



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Luminance guiding systems and signs for emergency exit routes



Signs for an accessible emergency exit route:



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Fire evacuation plan/concept/principles

Principles of fire evacuation:

- protection and evacuation for all should be incorporated **in an early stage of architectural design process – less further costs!!!**
- **first horizontal evacuation** for people with mobility impairments to a **‘relative place of safety’** (near or in the evacuation staircase)
- **vertical evacuation to the place of safety outside the building**
- fire engineering strategy needs to specify which occupant is to be evacuated to a „place of safety“ and who to a „relative place of safety“ – depending on their abilities
- **all lifts in new buildings** should be usable as **evacuation lifts**
- **all lifts in existing building**, when being replaced, should be made also usable as **evacuation lift**

Assisted fire evacuation

- every occupant should be able to **evacuate independently** to the greatest extent possible to the **‘relative place of safety’**.
- For those people who need assistance a strategy for the **provision of assisted evacuation** has to be developed.

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ISO 21542 Fire evacuation for all – details

- ❑ **Alarm: 2-sense principle**
 - acoustically and visually / vibration alarm in hotel rooms for people with hearing impairments
- ❑ **Possible evacuation routes for persons with mobility impairments** (using wheelchair, walking aids etc.)
 - **horizontal evacuation in another fire compartment** to a “**relative place of safety**” in or near the evacuation staircase; automatic doors;
 - down-going evacuation ramp max. 10 % (with assistance)
 - evacuation lift with independent electrical power supply
 - ‘relative place of safety’ in the evacuation staircase or in an adjacent room **to wait for further rescue assistance**, fittings: evacuation chair, independent emergency call system (battery-supply), smoke masks, stretcher, tactile information about location;
- ❑ **Support features for evacuation routes for people with vision and hearing impairments:**
 - 2-sense principles for all important information devices etc.
 - accessible handrails with tactile information, continuing on landings
 - tactile attention pattern before down-going flights of stairs,
 - contrasting color concept for handrails, floors, doors, etc.

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Management issues, skills and training

Management and maintenance issues are important factors that a building is easily accessed and used by disabled person:

- **all accessible routes and manoeuvring spaces have to be kept free.**
- accessible toilets have to be cleaned regularly and kept free of any clutter, storage etc.
- **maintenance of doors, opening forces etc. is important for ease of handling**
- **regular training is important that every occupant know the evacuation routes and places of relative safety**
- **effective rescue assistance has to be trained regularly with all persons (also firefighters) involved**

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2010 Tragical fire incident in a senior caring facility during night in Egg/Austria: 12 of 24 seniors death!



Cigarette rest in a waste bin in the 1. floor was the **main reason** of the tragically fire incident!

Elderly people with mental disorders are going out of their rooms died on **smoke gas toxicities!!!**

Too less carers during night for assisted evacuation in duty!

Questions:

- Can this fire incident happens again in any other existing senior home?
- How to avoid such fire incidents in elderly caring facilities???

New strategies are needed for Fire Safety for All!

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design for 



Questions?

Thanks for your interest!

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