New Standard EN 81-20/-50
Basic & Component Information

Wolfgang Adldinger
WITTUR

Chairman – Components Committee
European Lift Association (ELA)
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Background

General information:

- More than 12,0 million elevators worldwide
- About 5,8 million existing elevators in Europe
- More than 370.000 existing elevators in Turkey
- In Turkey are 20.000 new installations every year
- Elevator industry is getting bigger every day (rural depopulation, demographical change)
Major deficits of the EN 81-1/2:

- **Majority** of the worldwide countries are using the EN 81-series
- EN 81-1/2 is **over 30 years old** and no longer state of the art

- **Trading barriers** between the different continents (need of GTBFT)
  - **EN 81-20**: „Safety rules for the construction and installation of lifts – Part 20: Passenger and goods passenger lifts“
  - **EN 81-50**: „Safety rules for the construction and installation of lifts – Part 50: Design rules, calculations, examinations and tests of lift components“
General information:

- The members of the Components Committee from the European Lift Association (ELA) analyse and work on:
  - The comparison of the EN 81-1+A3 & EN 81-2+A3 to
  - EN 81-20 & EN 81-50
  - Checking of component requirements
  - Analyse the CEN/TR 81-12
  - Work on Information Note with impact of EN 81-20/50 to lift components
Example of affected components

Major affected components:

- Landing doors
- Car doors
- Safety devices
- Slings & frames
- Cars
- Electric drives
- Hydraulic drives
- Lift controller
- Electric equipment
- Well components
- Complete lifts
- ...

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The well

- Access to pits >2.5 m deep must be by stairs

- New requirements for pit access ladders and to provide them with a safety contact where necessary

- Normative text in clause 5, combined with a new normative annex giving the possible ladder types
All fire test certification of lift landing doors shall be EN 81-58

Unlocking mechanisms
- Horizontal Plane = 2,0 m maximum height
- Vertical Plane = 2,7 m maximum height with extended length unlocking key

In the unlocking zone, it shall be possible to open the car, the car and landing door by hand with a force ≤ 300 N

When the car is outside of the zone defined in 5.3.8.1, it shall not be possible to open the car door more than 50 mm with a force of 1000 N, at the restrictor mechanism
All doors in future, including their frame, will be subject to pendulum impact test at their weakest points.

NOTE 1  Figures 11.a and 11.f are alternative solutions. The worst case shall be tested. If it is not possible to determine the worst case, both or all variants shall be tested.

NOTE 2  For striking points defined by 1 m, the tolerance is ±0,10 m.

Key
- striking point for soft pendulum shock test
- striking point for hard pendulum shock test
## Forces and tests on doors

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<th>Force to be applied</th>
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<td>300 N over 5 cm²</td>
<td>&lt; 1 mm permanent</td>
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<td>&lt; 15 mm elastic</td>
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<td>No significant damage affecting safety integrity</td>
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<td>Soft pendulum @ 800 mm</td>
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<tr>
<td>All doors with their retainers</td>
<td>Soft pendulum @ 800 mm</td>
<td>No permanent deformation &gt; 120 mm</td>
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Lift car

- **Car design**
  - Car internal finishes to be of limited combustibility to EN 13501-1

- **Car lighting**
  - 100 lux normal lighting
  - 5 lux emergency lighting inside car/on car roof

- **Mirrors** used inside the car to be of safety glass to EN 12600

- New requirements for the strength of car walls and car apron

- All lift cars need to have a „toe board“ around the car roof edge

- Use of 1100 mm high balustrades when the distance to well wall exceeds 500 mm and additional needs to withstand horizontal force of 1000 N
Protection of sheaves, pulleys and sprockets

- **Example for nib guard**

- **Position and number of rope retainers**
  - If wrap angle > 120° and > 60° are below horizontal axis
    - 3 retainers
  - Other cases
    - 2 retainers

- **Pulley in the headroom**
  - Arrangement of pulleys above the projection of the car allowed
  - Retainers have to prevent the pulley from falling in case of mechanical failure
    (not for traction sheave)
Safety gear

- Release of the safety gear shall be possible at all load conditions up to rated load

- Requirement of a competent person to set lift to normal operation after release of safety gear

- Seal has to prevent re-adjustment without braking the seal

- Additional information on data plate

- Accidental tripping shall be prevented as far as possible

- Instantaneous safety gear with buffered effect deleted
Overspeed governor

- Requirement for higher tripping speed of overspeed governor for counterweight or balancing weight deleted
- Special design for heavy rated load and low speed deleted
- Requirement for sufficiently short response time not permitting dangerous speeds replaced by requirement for maximum distance between tripping points of 250 mm

- Type examination (EN 81-50)
  - At least 2 tests with acceleration 0,9 – 1,0 gₙ to check strength of overspeed governor
UCM - Unintended movement protection means

- Specific case added for lifts **without relevelling** and machine brake certified as UCM brake
  - No detection device needed

- If machine brake is used as UCM brake
  - May be placed on same shaft as traction sheave if shaft is only supporter in **2 points**

- Additional requirement **200 mm gap** for partly enclosed wells on landing side

- Requirements for maximum retardation in upwards direction with rated load deleted, covered by empty car condition
Guide rails

- Guide rails for low speeds manufactured with other methods than cold drawn or machined deleted

- Guide rail fixings containing non-metallic elements
  - Failure of non-metallic elements has to be considered for permissible deflections

- Safe operation has to be ensured by taking into account a combination of
  - Deflections of guide rails
  - Deflection of brackets and structure
  - Play in guide shoes
  - Straightness of guide rails

- Push through forces of rail clips may be ignored for travel height < 40 m
Specific requirements for buffer fixing to car or counterweight

Additional information on data plate

Maximum peak retardation $6g_n$ for energy accumulation type buffers with non-linear characteristic (PU buffers)

Fixing elements shall not be considered for the fully compressed situation (90%) for buffers with non-linear characteristic

Reduced buffer stroke
  - For rated speeds above 2.5 m/s
  - Minimum buffer stroke 420 mm

Dimension of buffers have to be specified in the certificate
Brakes of traction and positive drive lift machines

- More than 2 brake sets permitted
- Only failure of 1 brake set needs to be considered
- Brake release by continuous manual operation
  - Either mechanical (e.g. lever)
  - Or electrical powered by an automatic rechargeable power supply
- It shall be possible to test each brake set independently from outside the well
- Information for use and warnings, for reduced buffer stroke
Hydraulic equipment

- In case of multiple jacks the structure of the car, the car sling, guide rails and guide shoes shall keep car floor orientation and synchronise movement.

- Dimensions and tolerances of tubes and rigid pipes shall comply to EN 10305 series of standards.

- In case of jacks extending into the ground a protective tube shall be sealed at its bottom end.

- Minimum distance 0,30 m between guiding yoke of telescopic jacks and lowest part of the car.

- Additional filters between shut-off valve and non return valve.

- Maximum 0,30 m/s down speed with emergency lowering valve.
Protection against electric shock

- Protection against electric shock shall comply with IEC 60364-4-41 and EN 50274

Additional protection by means of 30 mA RCD

- Socket outlets
- Control circuits for landing controls and indicators and the safety chain having higher voltage than 50 V AC, and
- Circuits on the lift car having higher voltage than 50 V AC

Labelling for electrical hazards

- Protection of motors against overheating shall be provided for each motor

Main switches shall comply with EN 60204-1
 Inspection operation

 Inspection control station now mandatory in the pit

 Blue „Run“ button added to act with up and down buttons

 Push buttons shall comply to EN 60947-5-1

 Button colors derived from EN 60204-1

 Inspection speed shall not exceed 0,30 m/s when vertical distance above any standing area on car roof or in pit is 2,0 m or less

 If more than one inspection control station is switched to „INSPECTION“, it shall not be possible to move the car from any of them unless the same push buttons on the inspection control stations are operated simultaneously
Controls

- **Emergency Electrical Operation**
  - Now also required for hydraulic lift
  - Maximum speed 0.3 m/s
  - Inspection operation priority over Emergency Electrical Operation more clearly defined

- **Stopping devices**
  - Button type device (mushroom type) according to EN 60947-5-5 shall be used

- **Final limit switch**
  - Positive drive lift final limit switch can now be electric safety device
  - Electric safety device also in case of variable speed lifts

- **Emergency alarm device and intercom system**
  - The alarm is now specified as that of EN 81-28
EN 81-1+A3 & EN 81-2+A3 to EN 81-20 & EN 81-50

- EN 81-1/2+A3
- Coexistence EN 81-1/2+A3 & EN 81-20/50
- EN 81-20/50

We are now in March 2015
EN 81-1/2+A3 to EN 81-20/50 and European Lift Directive

- **Past**
  - LD 95/16/EC

- **August 2014**
  - Coexistence EN 81-1/2+A3 & EN 81-20/50

- **April 2016**
  - EN 81-20/50

- **August 2017**
  - LD 2014/33/EU

- **Future**

- **We are now in March 2015**
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Thank you for your time and attention

Wolfgang Adldinger
WITTUR – Technical Corporate Director Lift Norms | R&D
Chairman – Components Committee
European Lift Association (ELA)