

Escalator and Moving Walk Safety

European Recommendations
for Safety Improvements of
Escalators and Moving Walks in Operation



Disclaimer

The present guidelines are intended as a tool, among others, to help in assessing the safety of existing escalators and moving walks under EN 115-2. It is not intended as a substitute for each equipment owner's or technician's own assessment and decision-making regarding acceptable levels of safety and measures to be taken to improve the safety of an existing installation. ELA declines any and all liability for any measure taken or not taken on the basis of the present guidelines.

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ELA – the voice of the lift, escalator and moving walk industry in Europe

Today more than 75,000 escalators and moving walks are in operation in the European Union, of which over 50% were installed in the last century. This has led to a situation where there are different safety levels across Europe, with different risk levels with potential to cause accidents.

In today's legal environment, users and operators expect a joint approach to acceptable safety levels.

In 2010, the new European standard EN 115-2:2010 was published. It defines a common approach and describes clear procedures for achieving acceptable safety levels in existing units. Based on risk assessments, this standard categorises various hazards and hazardous situations, and also lists risks and corrective measures which can be implemented in a step-by-step manner.

In line with its mission, the ELA has therefore created this brochure, which describes the key risks and corrective measures for achieving acceptable safety levels per EN 115-2:2010.

New technologies and social expectations have led to today's state of the art for safety, which is based on:

- ▣▣▣▣▣ the European Machinery Directive 2006/42/EC,
- ▣▣▣▣▣ the harmonised EN 115-1 standard (Safety of escalators and moving walks – Construction and installation),
- ▣▣▣▣▣ the EN 115-2 standard (Rules for the improvement of safety of existing escalators and moving walks),
- ▣▣▣▣▣ the Use of Work Equipment Directive (UWED, 89/655/EC, 95/63/EC and 2001/45/EC),
- ▣▣▣▣▣ the Product Liability Directive (85/374/EC) and
- ▣▣▣▣▣ the General Product Safety Directive for the consumers (2001/95/EC).

The European Lift Association (ELA) represents the lifts, escalators and moving walks associations active in the European Union (EU) or the European Free Trade Association (EFTA), which may be either national associations or sector-specific associations. The ELA also represents their component manufacturers. With its very broad representation, the ELA is the main communication vector of the lift, escalator and moving walk industry to the European Commission, the European Parliament and various other international institutions and organisations. Its aim is also to help the national associations in their dialogue with their respective governments and the public at large.

In the context of these activities, the ELA monitors the progress of regulations and the state of the art in escalator and moving walk technology.

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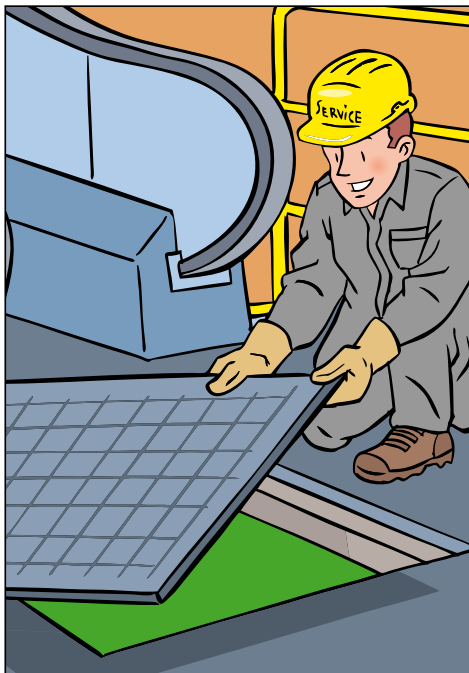
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1 Effects of harmful materials



Description of the risk

Harmful materials such as asbestos are present in brake linings, contactor shields or claddings. There is a risk of asbestos fibre being released to the air whenever the brake is applied.



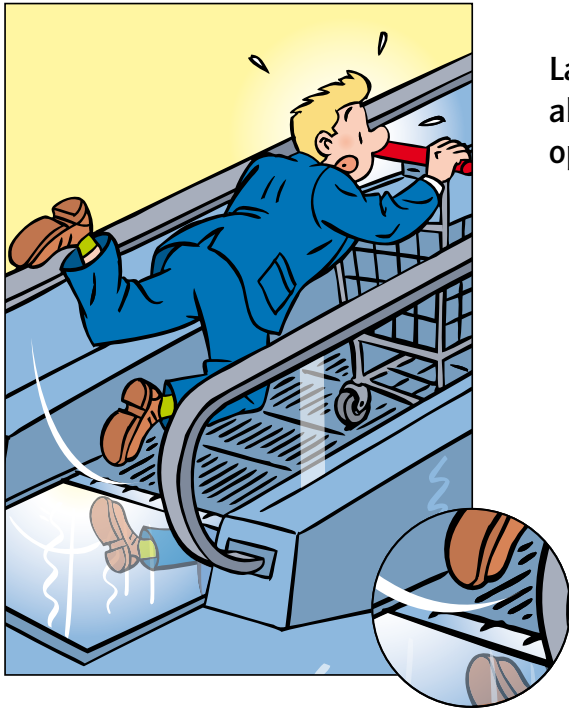
Risk reduction measures

Remove harmful materials subject to disintegration (e.g., replace brake lining material) and attach a warning label stating that maintenance work must not be performed unless the harmful materials (which may include the cladding) have been removed.

Reference to EN 115-2

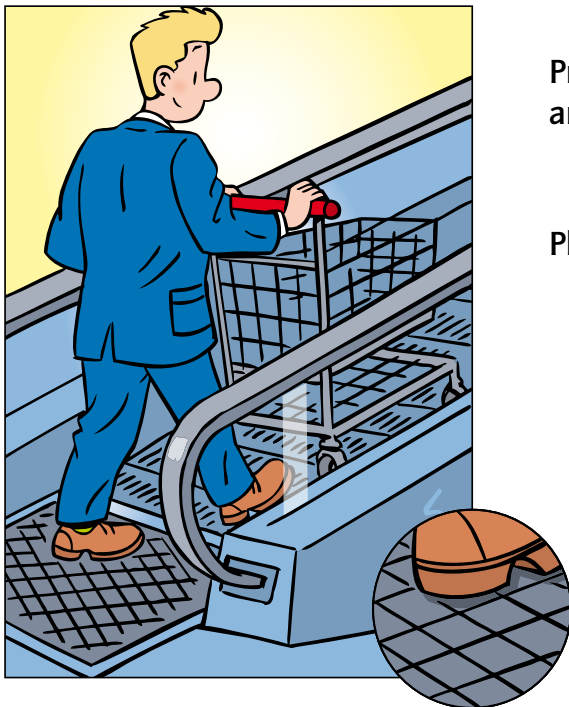
Please refer to clause 5.1

Slipping on steps/pallets/belt and on landings **2**



Description of the risk

Landing areas and tread surfaces may not always provide a secure foothold given the operating and environmental conditions.



Risk reduction measures

Provide secure foothold on tread surfaces and landing areas.

Reference to EN 115-2

Please refer to clauses 5.3.1 and 5.7.1

3 Entrapment between skirting and steps



Description of the risk

Risk of entrapment due to a gap between the steps and the skirting.



Risk reduction measures

Install skirt deflectors on escalators to minimise the possibility of entrapment between skirting and steps.

Reference to EN 115-2

Please refer to clause 5.5.3

Entrapment between steps or pallets 4



Description of the risk

Increased risk of objects/extremities getting trapped due to excessive gaps between steps or pallets.



Risk reduction measures

Reduce gap to an acceptable level.

Reference to EN 115-2

Please refer to clause 5.3.4

5 Missing steps or pallets



Description of the risk

Missing steps or pallets can have severe or even lethal consequences.



Risk reduction measures

Install at least two missing-step/pallet monitoring devices: one in the area of the drive station, the other in the area of the return station.

Reference to EN 115-2

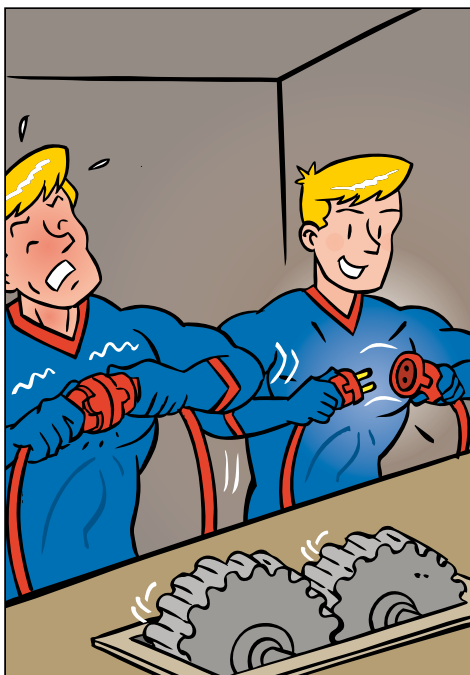
Please refer to clause 5.3.5

No stopping or re-starting due to absence of a second independent main contactor **6**



Description of the risk

For stopping and restarting requirements to be met, there should be two independent electrical devices. If there is only one contactor, its failure may lead to hazardous situations.



Risk reduction measures

Install a second independent device for interrupting the power supply.

Reference to EN 115-2

Please refer to clauses 5.4.1 and 5.4.2.3

7 Falling due to stopping distance being too short



Description of the risk

If the escalator or moving walk is stopped unexpectedly, people may fall if the stopping distance is too short.



Risk reduction measures

Provide a brake system that meets the defined stopping distance requirements.

Reference to EN 115-2

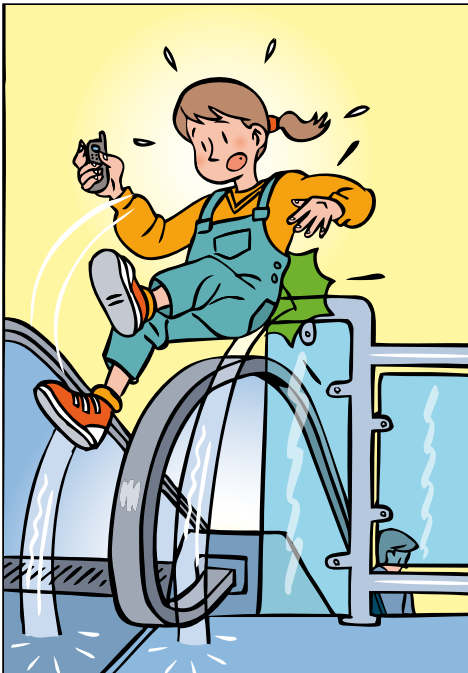
Please refer to clause 5.4.2.6

Falling from a landing 8



Description of the risk

At a landing, persons may come into contact with the outer edge of the handrail and as a result fall from the landing, e.g., by toppling over the balustrade.



Risk reduction measures

Increase the height of the building structure supporting the fixed balustrade in the hazardous area.

Reference to EN 115-2

Please refer to clause 5.13.1.6

9 Climbing the balustrades



Description of the risk

Climbing the balustrades may result in serious injury.



Risk reduction measures

Provide anti-climbing devices on outer deckings.

Reference to EN 115-2

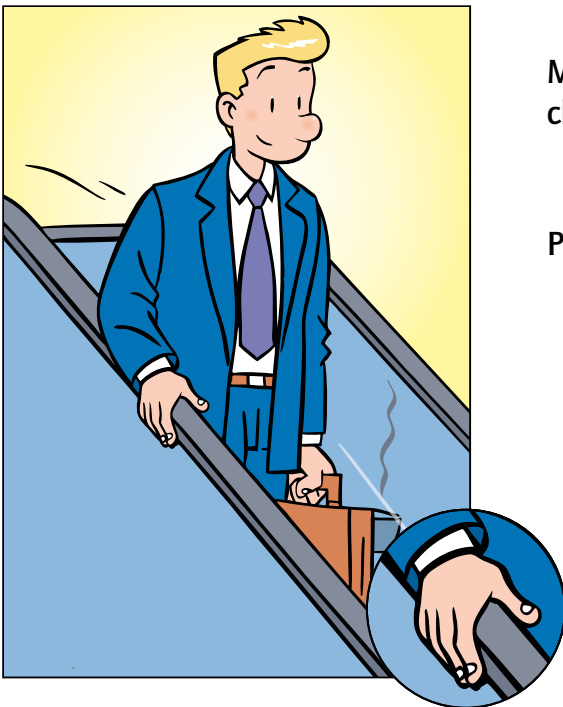
Please refer to clause 5.5.2.3

Crushing of fingers between handrail and balustrade 10



Description of the risk

Excessive gaps between the handrail and the balustrade profile can cause fingers to become trapped.



Risk reduction measures

Modify components to achieve acceptable clearances.

Reference to EN 115-2

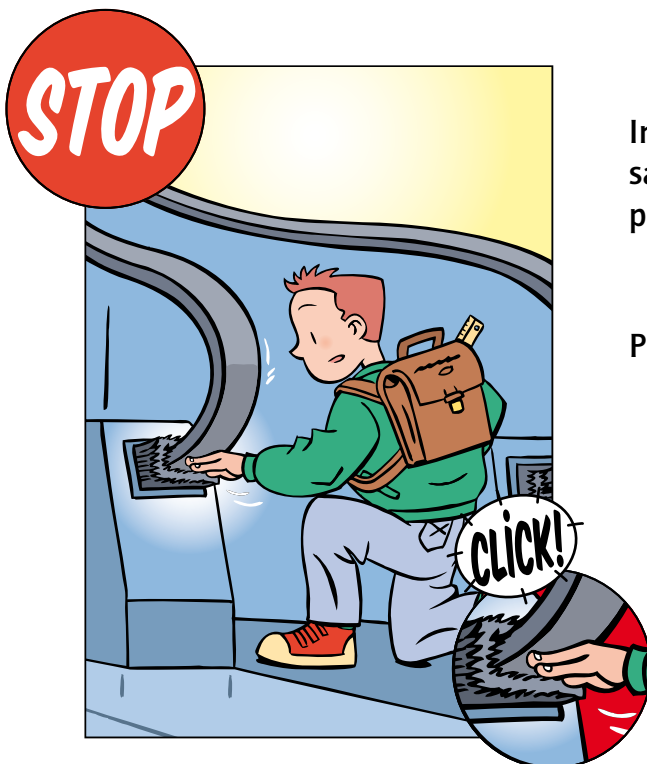
Please refer to clause 5.6.2

11 Entrapment at handrail entry points



Description of the risk

If there are no guards at the handrail entry points, fingers may be trapped, resulting in injury if the escalator or moving walk does not stop.



Risk reduction measures

Install adequate guards and electrical safety devices at the handrail entry points.

Reference to EN 115-2

Please refer to clause 5.6.3.1

Entrapment between combs and steps/pallets/belt 12



Description of the risk

Insufficient meshing between the combs and the tread surfaces of the steps/pallets or the belt may result in entrapment.



Risk reduction measures

Provide combs designed so that if a foreign object becomes trapped, they either deflect and remain in mesh with the grooves of the steps, pallets or belt, or break.

Provide an electrical contact that stops the unit if an object impacts the combs.

Reference to EN 115-2

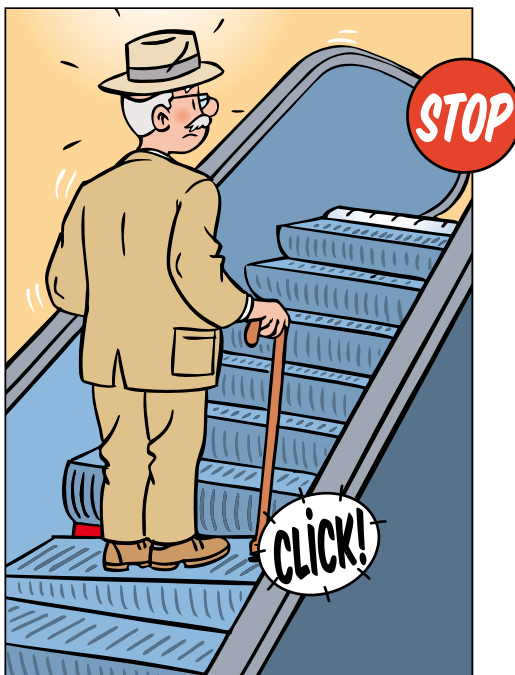
Please refer to clauses 5.7.2 and 5.7.3

13 Entrapment due to sagging step/pallet



Description of the risk

Excessive distance between combs and tread surfaces due to sagging steps/pallets may result in entrapment.



Risk reduction measures

Install an electrical safety device at a proper distance before the comb intersection line.

Reference to EN 115-2

Please refer to clause 5.7.4

Insufficient space in working area 14



Description of the risk

An authorised technician performing maintenance or repair work in the drive or return station could become trapped if there is insufficient space.



Risk reduction measures

Provide a device (e.g., light beam) to detect persons approaching the hazardous area at the drive or return station.

Normal and inspection operating modes should be interrupted if a person is detected.

Reference to EN 115-2

Please refer to clause 5.8.2

15 Inadequate lighting in working area and surroundings



Description of the risk

Inadequate or non-compliant lighting can result in unsafe working conditions.



Risk reduction measures

Provide one or more socket outlets for lighting in the drive and return stations and machinery spaces inside the truss.

In areas where maintenance or repair work is performed, the light intensity must be at least 200 lux.

Reference to EN 115-2

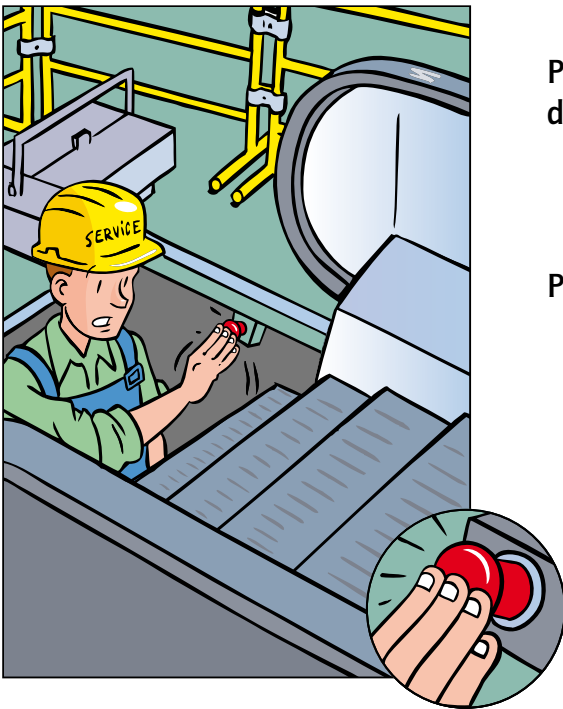
Please refer to clause 5.8.4

No emergency stop switch in working area 16



Description of the risk

An authorised technician working in the drive or return station could be injured if there is no stop switch.



Risk reduction measures

Provide emergency stop switches in the drive and return stations.

Reference to EN 115-2

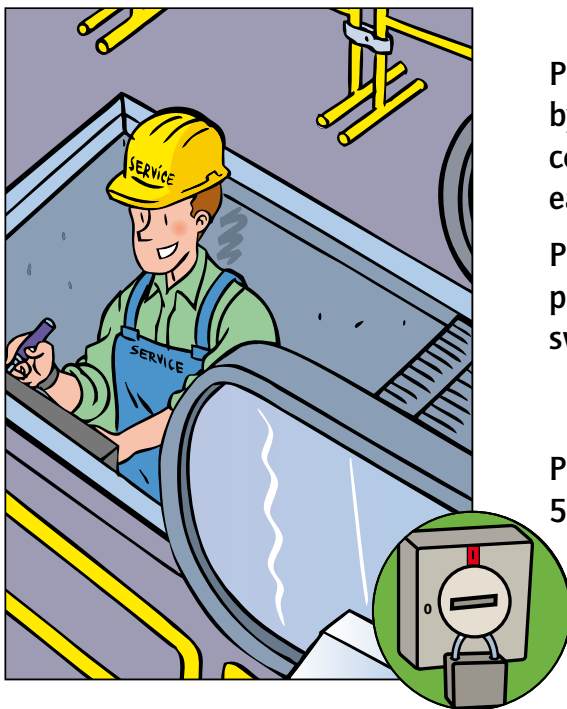
Please refer to clause 5.8.5

17 Electric shock due to contact with live parts



Description of the risk

Insufficient insulation and/or insulation failure that causes a person to come into contact with live current is unacceptable. This also includes unsafe working conditions due to the absence of a main switch.



Risk reduction measures

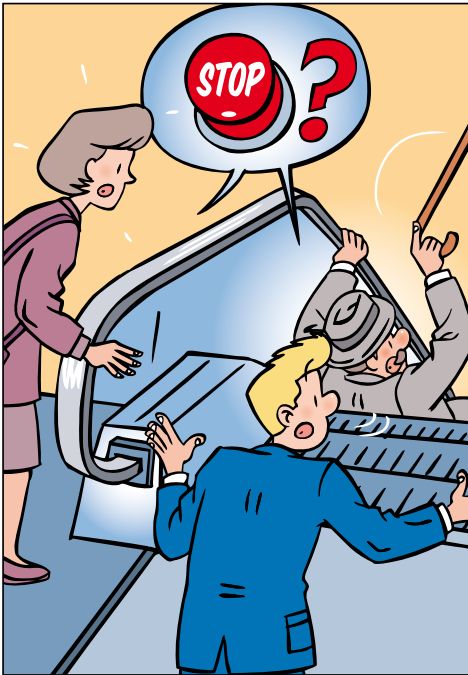
Provide protection against electric shock by adequately insulating live electrical components and by providing adequate earthing.

Protect the unit against unintentional powering up by installing a lockable main switch.

Reference to EN 115-2

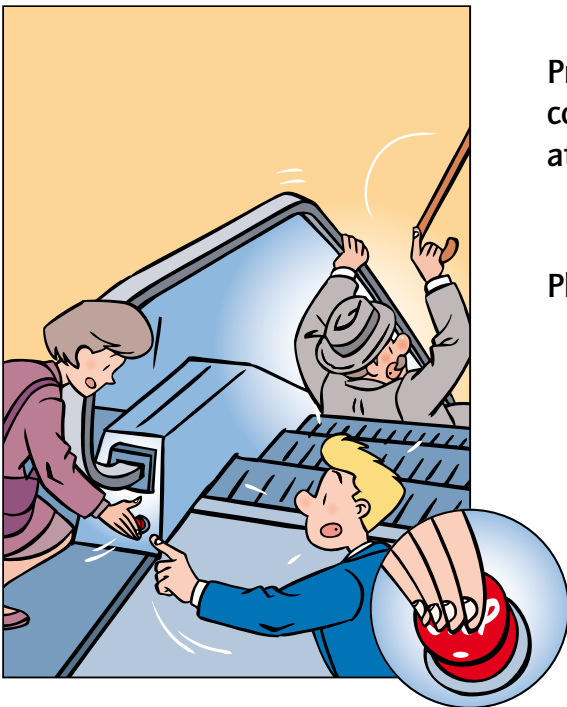
Please refer to clauses 5.11.1.1, 5.11.1.2, 5.11.1.3, 5.11.2, 5.13.3

Injury due to absence of an emergency stop switch 18



Description of the risk

If there is no switch with which a user can stop the escalator or moving walk in an emergency, injuries may result.



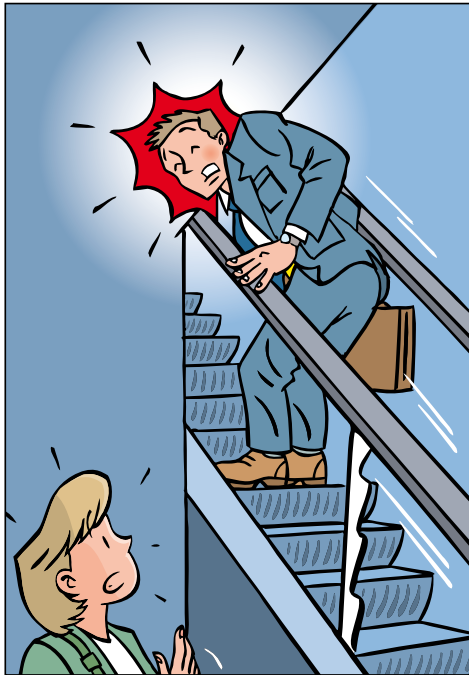
Risk reduction measures

Provide emergency stop switches in conspicuous and easily reachable positions at or near the landings.

Reference to EN 115-2

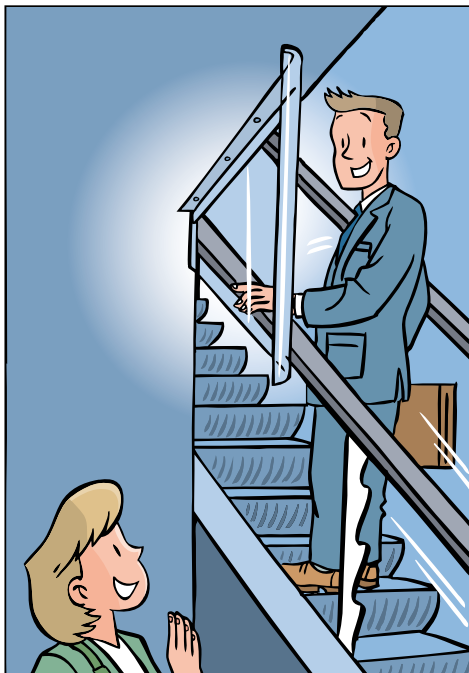
Please refer to clause 5.12.1

19 Collision with building structures



Description of the risk

Building obstacles such as walls, pillars, floor intersections or criss-cross arrangements of escalators/moving walks can cause injuries.



Risk reduction measures

Provide correctly positioned deflectors.

Reference to EN 115-2

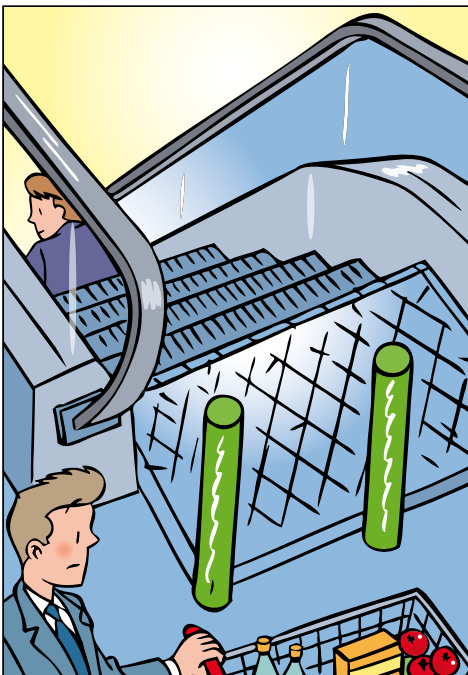
Please refer to clauses 5.13.1.1, 5.13.1.2, 5.13.1.3

Improper use of an escalator to move a shopping or baggage cart 20



Description of the risk

If a person deliberately misuses an escalator by using it to move a shopping or baggage cart, this may put other people at risk.



Risk reduction measures

Provide barriers to prevent access with shopping or baggage carts. This keeps the space free for appropriate use.

Reference to EN 115-2

Please refer to clause 5.15



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This document was prepared by experts of the Escalators and Moving Walks Work Group of ELA in 2010.

It is illustrated by drawings from Zack, which are available free of charge in high and low resolution on the ELA website at **www.ela-aisbl.org**

Make the fullest possible use of this brochure and drawings



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