

ANEC Technical Study: Trampolines and Trampoline Parks¹

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Executive summary

Bouncing/trampolining is much enjoyed by children and adults, from a range of age groups and skill levels. In the past two decades, the use of trampolines in leisure and recreational activities has greatly increased worldwide.

Despite several benefits for users - namely health benefits, improving fitness, dynamic balance and motor performance - trampolines are a common source of paediatric injury. Although fatalities and disabilities appear less frequent events, there are cases that have resulted in death or quadriplegia.

ANEC, the European consumer voice in standardisation, decided to launch this Technical Study to understand the dimension and characteristics of the problem and risk factors behind injuries, and to undertake a gap-analysis of

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the existing standards for trampolines and trampoline parks, as well as those under development.

Aim

To aid the elaboration of proposals for improvement of European Standards applicable to trampolines (EN 13219: 2008; EN 71-14: 2014+A1:2017; EN 1176-1: 2017) and the standard for trampoline parks under development (prEN ISO 23659).

The study was made in 4 tasks. First, the methodology included a literature review of Trampoline Injuries and analysis of Trampoline Injuries in the EU-Injury Database (Task 1). Second, an identification of the most critical safety related aspects for design; construction; use and operation of trampolines, in both related to the environment (equipment, surfaces, surroundings) and different types of usage. These included research and analysis of existing trampolines, recalled products, consumer reviews, online surveys, interviews, mystery clients and qualitative observation of users' behaviours (Task 2). Tasks 3 and 4 included a cross-analysis of existing relevant standards, published or under development, to identify whether the injury scenarios and critical aspects for safety resulting from Task 1 and Task 2 were addressed.

Task 1 outputs- Epidemiology of Trampoline Injuries

1. There has been an increase in trampoline injuries in recent years, even though the large majority are not serious.
2. Falls are by far the most common mechanism, and include mostly failed landings on the trampoline and falls on the edge of the trampoline.
3. Stunts are an important cause of severe injuries and spinal injuries.
4. Sprains and fractures are the most common injury in different studies, with the age group with most injuries being 5 to 9 years old.
5. Injuries in trampoline parks are rising, while injuries where trampolines are used elsewhere have remained stable or with lower rates of increase.
6. Some studies with large samples showed a higher percentage of fractures and dislocations, lower extremity fractures, more hospital admissions and more surgical interventions associated with trampoline parks compared with domestic trampolines.

7. Research and published data on fatalities, and permanent or temporary disabilities due to trampoline injuries, are scarce, although cases have been reported in scientific communications and the media of spinal cord injuries, traumatic brain injuries and deaths in trampoline parks. Most of them resulted from unsuccessful attempts at stunts (such as flips) or the incorrect use of facilities.

Main Recommendations from Task 1:

1. Prevention of severe injuries should prioritise communication of risks and in person support/close supervision strategies in trampoline parks that minimise attempts at stunts by untrained users, and the incorrect use of facilities (jumps in pits, use by multiple users). Warnings of the risks of stunts in home and park trampolines need to have impact.
2. Children aged 5 to 9 years and younger seem to be at increased risk of injury, and extra precaution and communication of risks should be ensured with parents and children, as well as close supervision in trampoline parks and in use of home trampolines.

Task 2 outputs- Environment, task, user characterisation and safety analysis

1. There is a lack of an adequate categorisation of trampolines in order to understand and manage risk according to their characteristics. A table was elaborated (Report, Annex 2) containing all types of trampolines.
2. The domestic trampolines (EN 71-14) standard requires an enclosure of inadequate size, and there is no reference to the thickness of the padding.
3. In the gymnastic trampolines (EN 13219) standard, there is no reference to landing areas or the characteristics of mats.
4. The content and conditions under which the safety briefing in trampoline parks is provided are not satisfactory.
5. The supervision by the monitor assigned to a certain area was not always appropriate.

6. "Free users" are considered by operators to be the most frequent type of user, but "organised/leisure groups" were considered the most frequent users by staff.
7. The two age groups most frequently found in the trampoline parks are users of 5 to 9 and 10 to 14 years of age.
8. The majority of users have only a basic skill level.
9. Two users jumping on the same trampoline does happen, most often when the total of users is higher than the number of trampolines (Report, Annex 3).
10. According to experts, the biggest risk in the use of domestic trampolines is absence of knowledge on using the trampoline properly. In trampoline parks, the risks are related to uncontrolled jumps/stunts done by users without a sense of danger.
11. As the different brands of trampoline have different characteristics in the catalogues, it is difficult to compare models.
12. According to all operators, information on use and safety rules is provided before users start the activity.
13. The number of users per monitor in trampoline parks is high and number of monitors by activity area low for some parks.
14. Monitors are often unqualified and lack knowledge of the techniques to be performed and how to support users' activity.
15. All operators have a procedure in case of accident, injury, sudden illness or emergencies, and for recording these occurrences.
16. According to operators, at least one member of staff has specific training in first aid.
17. The most frequently injured body part is described by all the operators as "lower extremities", and the second as "upper extremities" (Report, Annex 5).
18. In trampoline parks, the main risks seen by experts were uncontrolled jumps due to lack of technical skill, users without an adequate perception of danger and untrained monitors.
19. The registration units obtained from user reviews of trampoline parks focus on situations and issues related to the safety of users, particularly

those linked to the supervision of the activity by staff; the high number of users per trampoline space and area; instructions of use and safety rules (Report, Annex 7).

20. Risks related to recalled products were diverse, with the most frequent being slipping through an opening, hitting the ground or getting trapped (Report, Annex 8).

Main Recommendations from Task 2:

1. Harmonised classification for different trampolines should be developed, reflecting domestic, gymnastic or playground use, and taking into account shape, design, enclosure and padding. The classification should include not only size of the trampoline, but the characteristics of the suspension system, as this is related to the rebound capacity of the trampoline.
2. In the standard for domestic trampolines (EN 71-14) the enclosure size for a medium trampoline needs to be 1,8m, and for a large trampoline, 2,2 m. This standard should also include a reference to the thickness of the padding.
3. The standard for gymnastic trampolines (EN 13219) should be revised to include more information on the landing areas, containing systems and surrounding characteristics.
4. It is necessary to establish minimum contents for safety briefings and staff training in a standardised form.
5. Monitors should control the jumping time, which should be a maximum of 1 – 1½ minutes, 4 or 5 attempts at a skill, or 2 routines.
6. For the user's safety, it is important to define rules for user access to more difficult areas. The number of staff/monitors per user and per area, and the number of staff/monitors with first aid training, should be higher.
7. To increase safety in trampoline parks, there need to be practice areas that filter users according to skill level (Report, Annex 4).

Task 3 outputs and recommendations – Cross-comparison between standards

1. Uncovered risks (totally or partially), and gaps in requirements and test methods, were identified in each standard.
2. This analysis, in conjunction with other findings, permitted the identification of safety problems, and/or not acceptable risk situations, in the different contexts of trampoline use. For each recommendation, a supported proposal was presented.
3. The list of safety problems includes:
 - a. Existence on the market of trampolines that are not covered by any of the existing standards;
 - b. The criteria for classification of trampolines differ between standards;
 - c. Big domestic trampolines are considered toys and are included in EN 71:14;
 - d. Height of the enclosure of medium and large trampolines in EN 71:14 is only 1,5m;
 - e. Impact attenuating surface required around buried trampolines (in EN 71:14) is only 1m;
 - f. The method of rebound measurement;
 - g. Existence of High Performance Trampolines in Trampoline Parks;
 - h. Existence of dismount pits in Trampoline Parks;
 - i. Inadequate conditions in which the briefing is made;
 - j. Poor intervention by staff in trampoline parks;
 - k. Domestic trampolines used without preparation and adequate supervision;
 - l. Mix of users with different ages, heights, and skill levels;
 - m. More than one person jumping at a time on one trampoline;
 - n. Age limitation on the use of trampolines.

Task 4 outputs - Comments on standards

Task 4 compiled comments to improve EN 71-14:2018, EN 13219:2008 and EN 1176-1:2017 (particularly its chapter 4.2.16 Bouncing Facilities), and recommendations for the future standard for Trampoline Parks under development in CEN TC 136 WG17.

As a result of this study, the priority steps to ANEC actions should be:

- 1) Argue for a full revision of the standard for gymnastic trampolines, EN 13219;
- 2) Present the proposed classification (seen Report, Annex 2) to CEN TC 52 WG 10 (activity toys), CEN TC 136 WG SC1 (playground), CEN TC 136 WG 22 (gymnastic and playing field equipment), CEN TC 136 WG 17 (trampoline parks);
- 3) Ask the European Commission to reconsider its position concerning the standardisation of trampolines stated in the letter to CEN TC 136 WG 10 of 2011 (document N 127 of this committee);
- 4) Call for a new standard for trampolines that should not be considered toys (trampolines with a rebound more than 30 cm and for users over 25kg);
- 5) Defend in the relevant CEN TC the fundamental recommendations of this report related to toy trampolines (CEN TC 52 WG 10, bouncing facilities - CEN TC 136 SC 1 and trampoline parks - CEN TC 136).