Trampoline parks:
A scientific perspective

DACH - Conference in Sport 2020

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USA: 14 July 2011

Trampoline parks grow by leaps and bounces

By Bruce Horovitz, USA TODAY Updated 7/14/2011 3:58 PM | | Share

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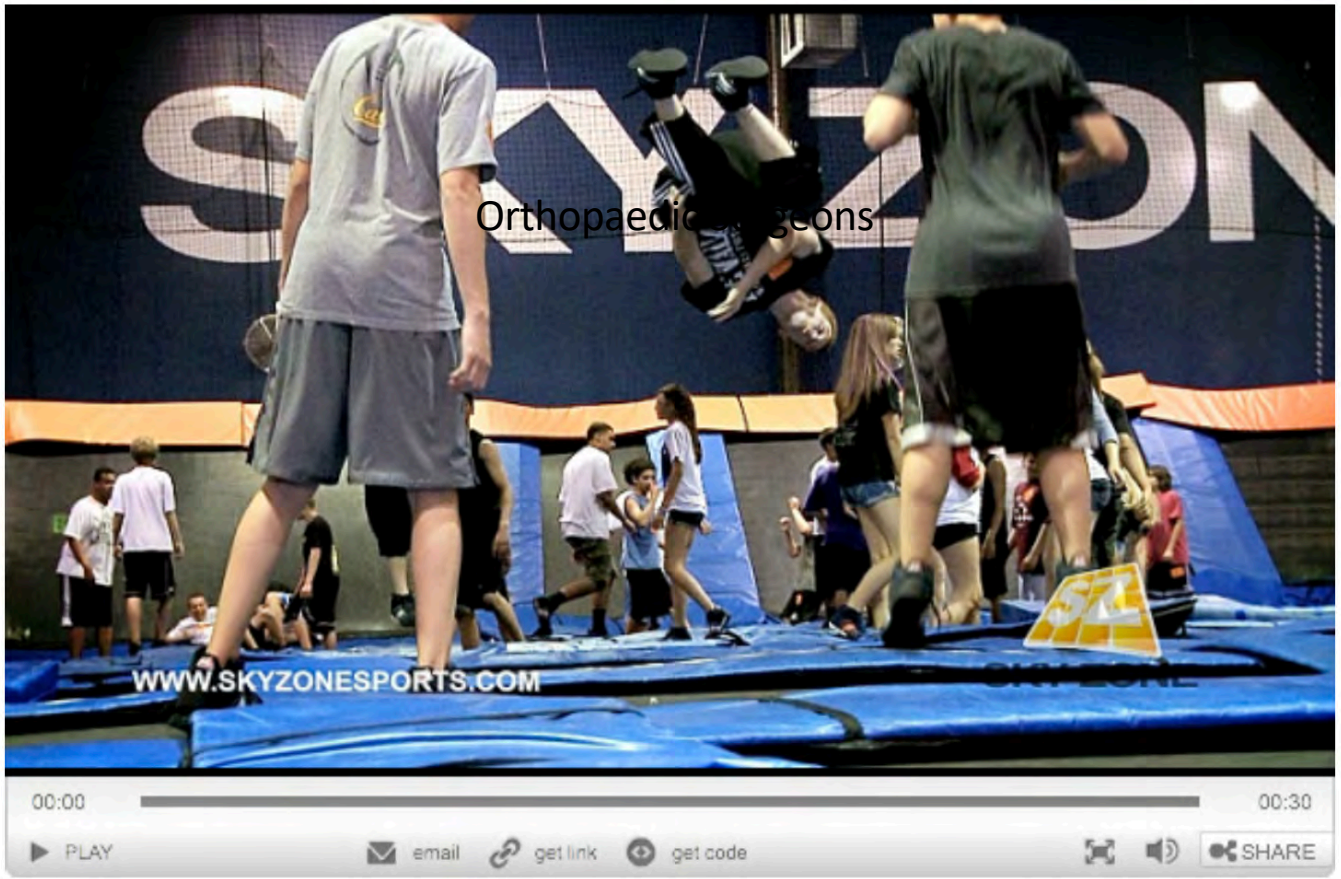


USA: 1 April 2013

Designation: F2970 – 13

Standard Practice for Design, Manufacture, Installation, Operation, Maintenance, Inspection and Major Modification of Trampoline Courts[1]

This standard is issued under the fixed designation F2970; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The purpose of this practice is to delineate requirements regarding the design, manufacture, installation, operation, maintenance, inspection and major modification of commercial or institutional trampoline courts with the primary purpose of amusement, entertainment or recreation.

1.2 This standard applies to institutional trampoline courts that are located in and around amusement, entertainment or recreational facilities. Such facilities include but are not limited to trampoline parks, amusement parks, theme parks, water parks, family entertainment centers, fitness centers, gyms, gymnastics facilities, sports facilities, skate parks, camps, shopping centers, temporary special events, carnivals and municipal parks.

1.3 This practice establishes guidelines that will provide a level of conformity for the purpose of reducing potential hazards to patrons, court attendants, and spectators.

1.4 This standard does not purport to address all of the hazards associated with institutional trampoline courts. The standard's existence alone will not prevent injuries. Like other physical activities, institutional trampoline court use involves the risk of injury, particularly if the equipment is used improperly or if users exceed their capabilities, endurance, training, or experience.

1.5 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.6 This practice includes an annex (mandatory), which provides additional information (for example, rationale, background, interpretations, drawings, commentary, and so forth) to improve the user's understanding and application of the criteria presented in this practice. The annex information shall be interpreted as mandatory criteria.

1.7 This practice includes an appendix (non-mandatory), which provides additional information (for example, rationale, background, interpretations, drawings, commentary, and so forth.) to improve the user's understanding and application of the criteria presented in this practice. The appendix information shall not be interpreted as mandatory criteria.

1.8 This standard includes the following sections:

	Section
Scope	1
Referenced Documents	2
Terminology	3
Significance and Use	4
Quality, Manufacture, Construction and Installation	5
General Design	6
Design	7
Major Modification	8
Information Plate	9
Information Requirements	10
Certifications	11
Performance Criteria	12
Classification of Injuries and Illnesses	13
Notification Requirements	14
Manufacturer Responsibilities	15
Owner/Operator Responsibilities	16
Patron Education	17
Patron Responsibility	18
Keywords	19
Annex	Annex A1
Appendix	Appendix X1

1.9 *Units*—The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.10 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D737 Test Method for Air Permeability of Textile Fabrics

[1] This test method is under the jurisdiction of ASTM Committee F24 on Amusement Rides and Devices and is the direct responsibility of Subcommittee F24.60 on Special Rides/Attractions.

Current edition approved April 1, 2013. Published June 2013. DOI: 10.1520/F2970-13.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

Australia: 12 June 2014

Code of Practice

for

Design, Manufacture, Installation, Operation,

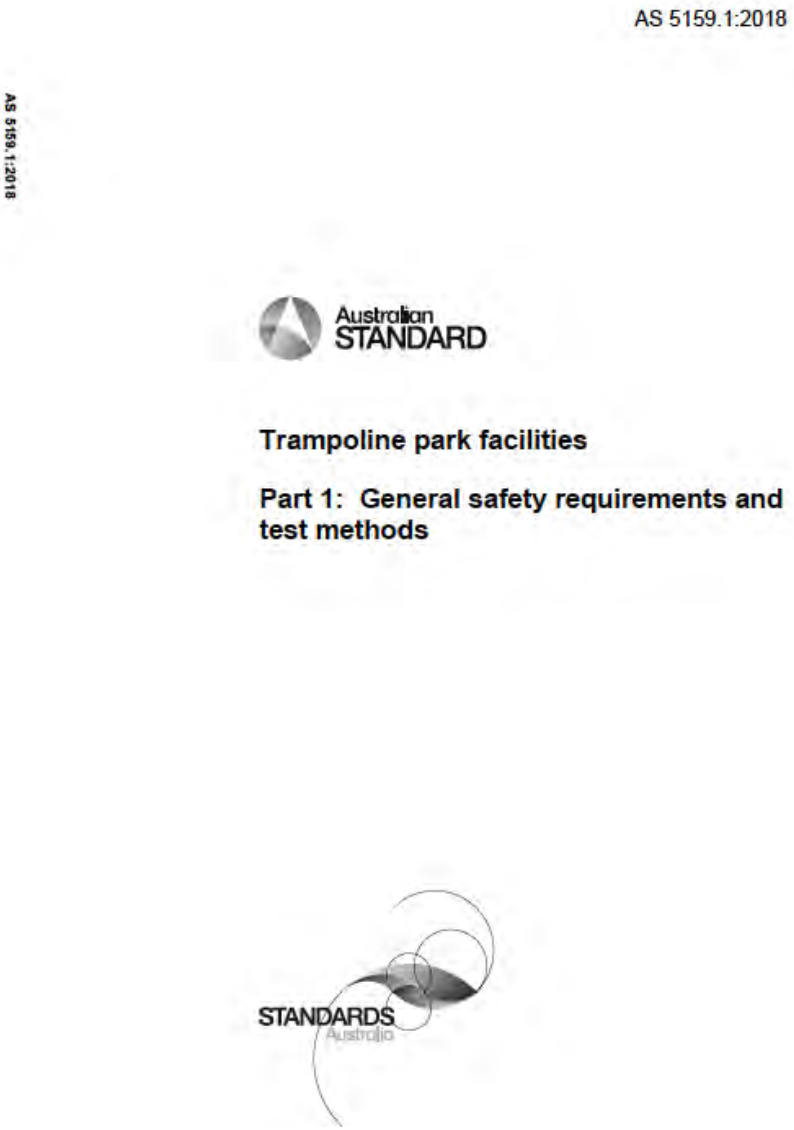
Maintenance, Inspection

and

Structural or Major Modification of Trampoline Parks

Effective date 12 June 2014

Australia: 22 October 2018

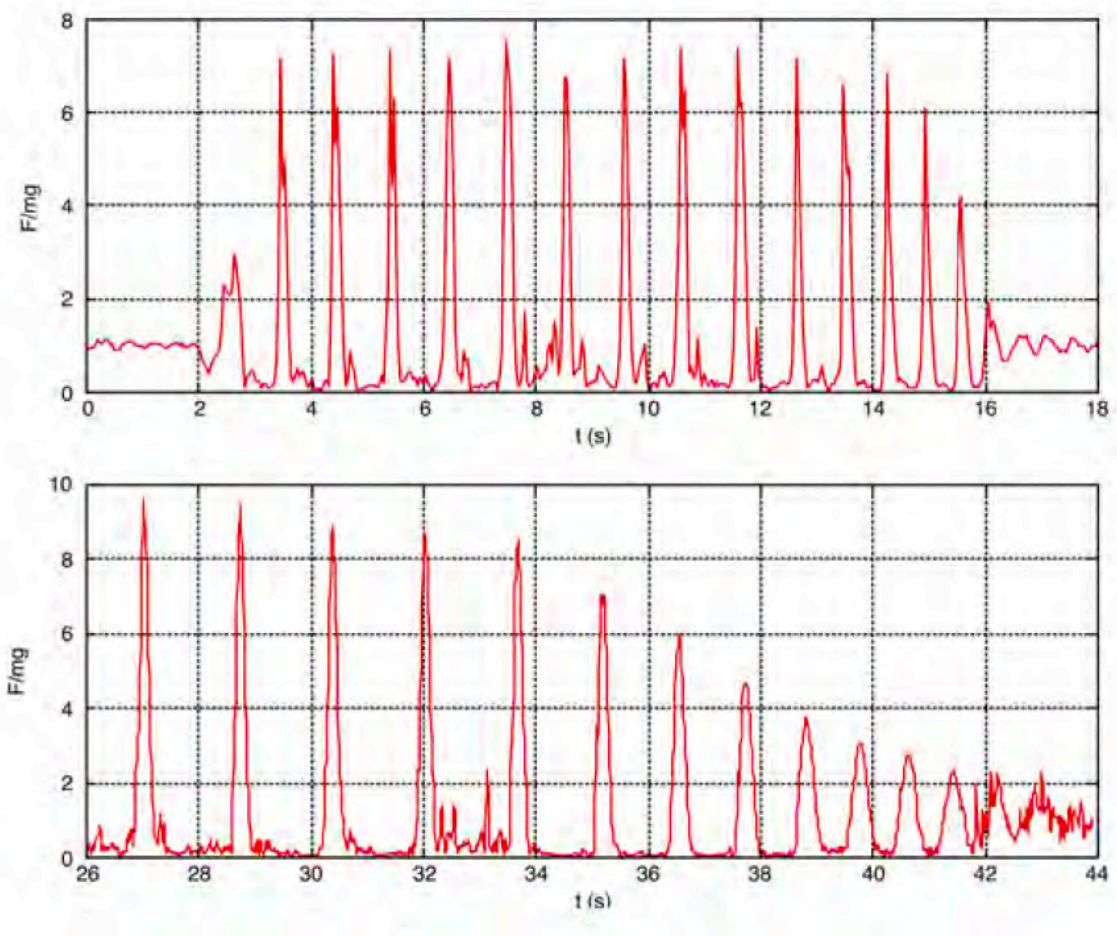


Dismount pit testing video

Head first entry into a foam pit

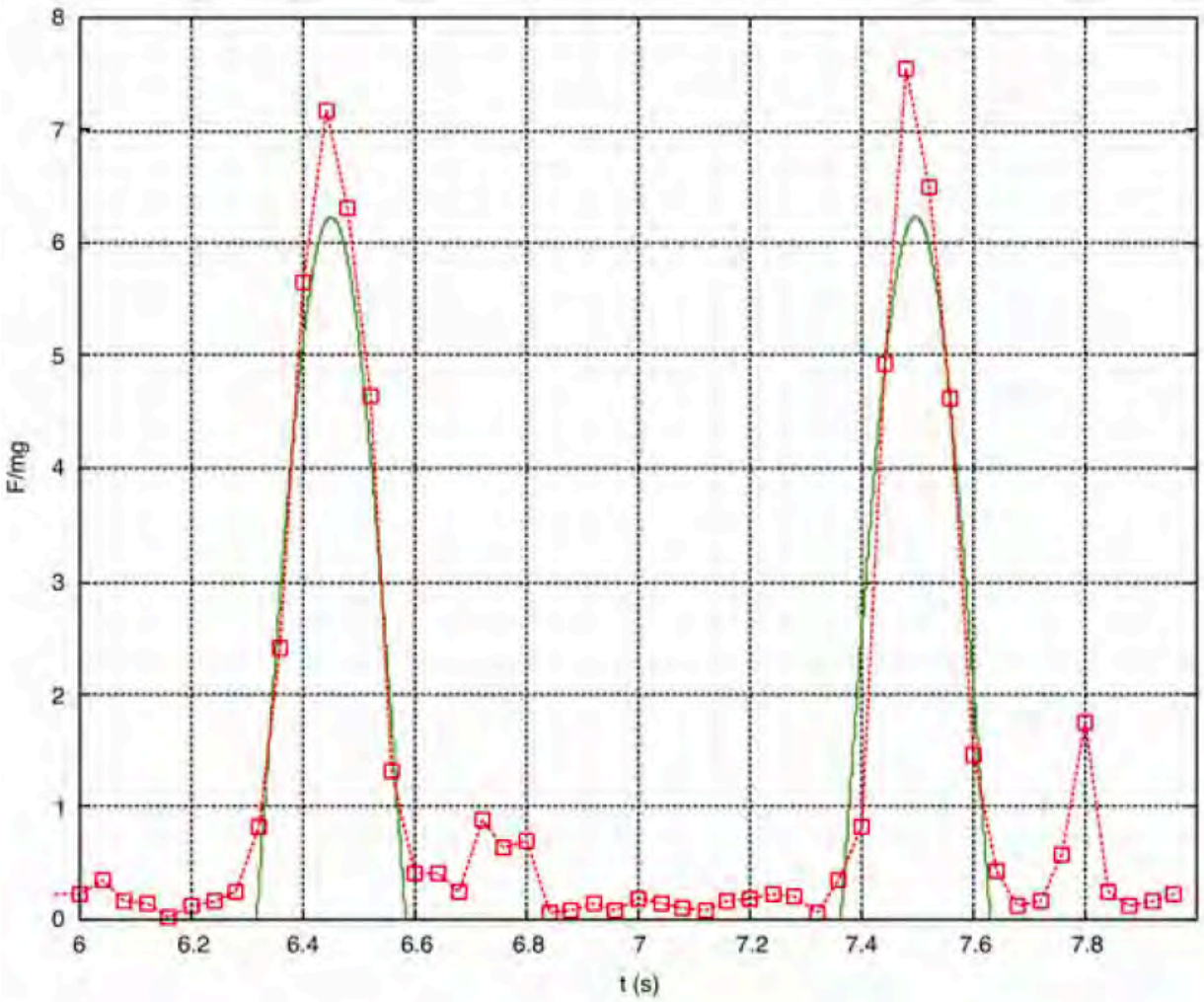
Repercussion of head first entry into foam pit

Acceleration data



Acceleration data

Free fall and hormonic oscillations: analyzing trampoline jumps



Free fall and harmonic oscillations: analyzing trampoline jumps

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Abstract

Trampolines can be found in many gardens and also in some playgrounds. They offer an easily accessible vertical motion that includes free fall. In this work, the motion on a trampoline is modelled by assuming a linear relation between force and deflection, giving harmonic oscillations for small amplitudes. An expression for the cycle-time is obtained in terms of maximum normalized force from the trampoline and the harmonic frequency. A simple expression is obtained for the ratio between air-time and harmonic period, and the maximum g-factor. The results are compared to experimental results, including accelerometer data showing 7g during bounces on a small trampoline in an amusement park play area. Similar results are obtained on a larger garden trampoline, and even larger accelerations have been measured for gymnastic trampolines.

1. Introduction

Where do you experience the largest forces in an amusement park? Amusement park standards allow rides that make the rider feel up to 6 times heavier than normal, i.e. 6g, although many modern roller coasters stay well below 5g. As the Liseberg amusement park in Gothenburg, Sweden [1] recently asked its Facebook followers to guess which rides involve the largest forces, it was hardly surprising that the newer roller coasters and a free fall ride were the favourites. However, larger forces—up to 7g—were in fact encountered in the small trampoline found in the children's playground area at Liseberg (the 'Rabbit Land'). Similar data have also been obtained in a round domestic trampoline, such as the one shown in figure 1, where a spiral toy is used to provide a visual illustration of the forces on the user. (The same toy has been used to illustrate forces in a swing [2].) When the feet are not in contact with the trampoline, the user experiences free fall (0g), and the spiral in the toy is contracted. At the bottom of a the jump, when the trampoline bed experiences the largest displacement, a large force is exerted on the user, as illustrated by the extension of the spiral in the toy. Below, we first analyze the motion during bounces on a trampoline, and then compare the results to data from the trampoline in Liseberg's Rabbit Land.

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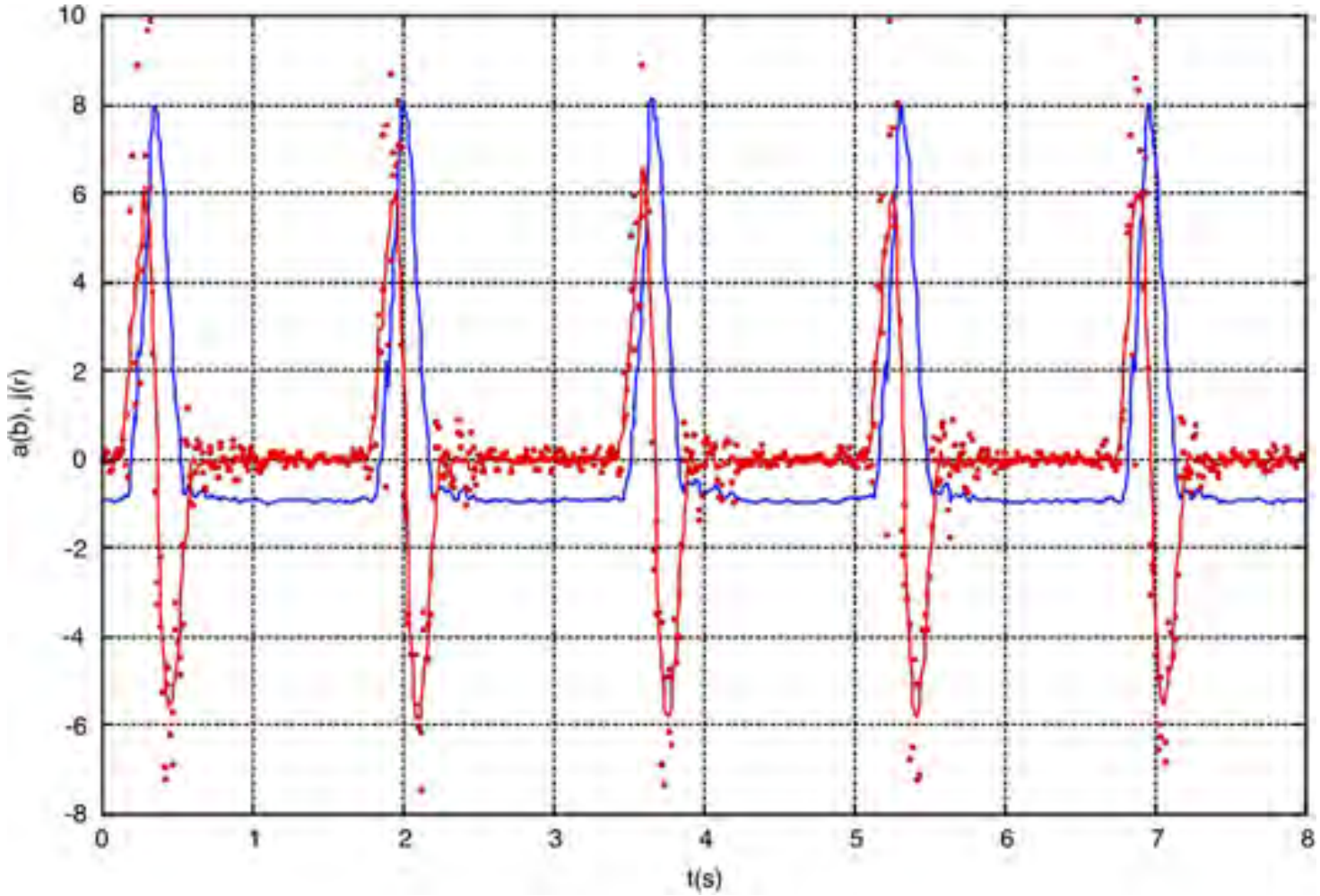
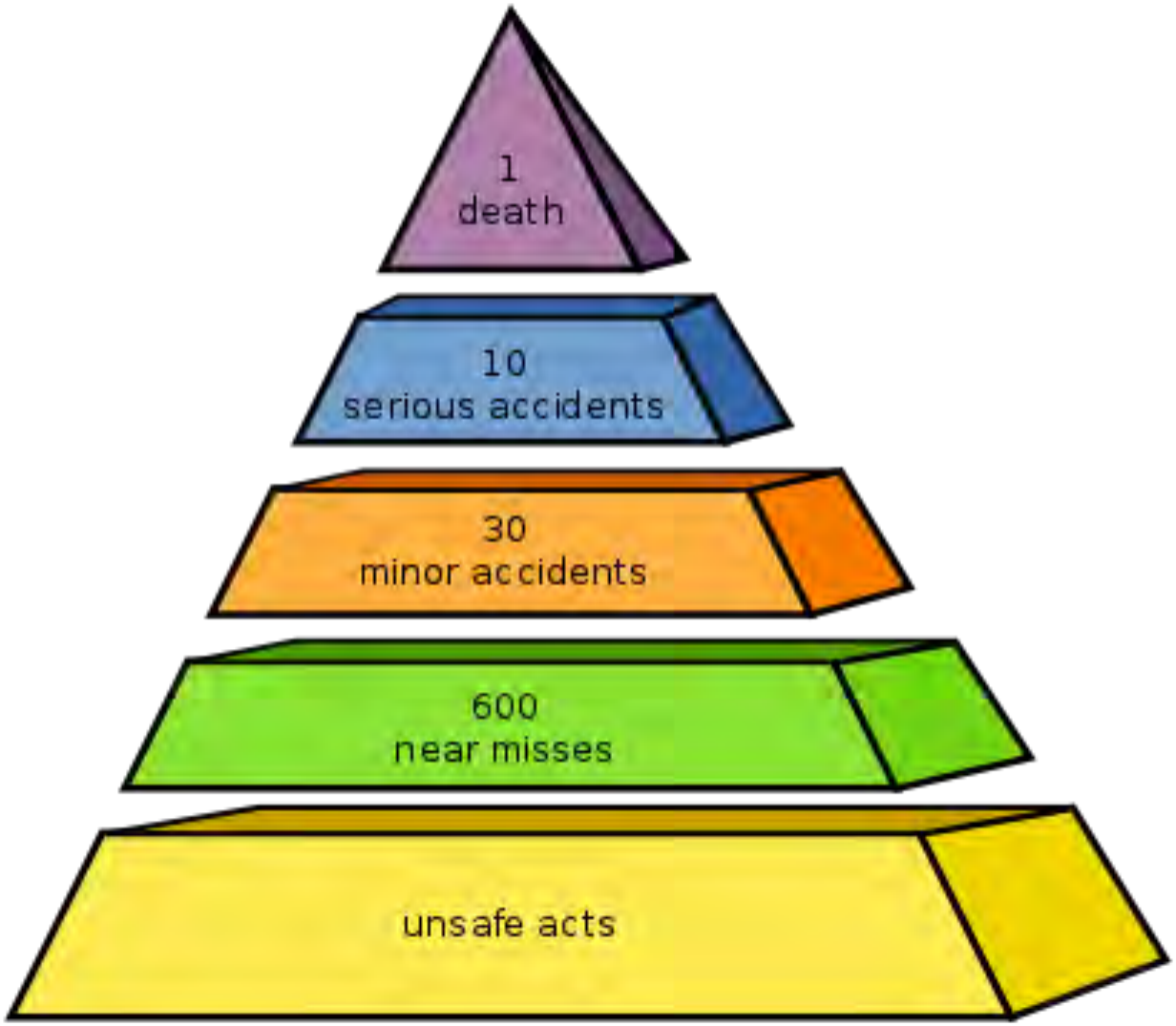
Acceleration data



Pyramid of risk



Facts

Trampoline parks are popular around the world and are an increasing source of preventable debilitating injuries

There are six known trampoline park fatalities

There are also positive benefits from trampoline parks such as rigorous exercise, balance, coordination pumping toxins within the lymphatic system etc.

Trampoline parks from a scientific point of view

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