UNATTENUATED VERTICAL WALLS IN TRAMPOLINE PARKS ARE SAFER THAN ATTENUATED VERTICAL WALLS

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Introduction

This paper discusses a novel use of vibration equipment to assess the safety of whether to pad or not to pad the vertically orientated walls within trampoline parks used specifically for an activity known as *walk-the-walk*.
The CEN/TC 136 WG 17 is currently drafting EN ISO 23695:202x Trampoline Parks – Safety requirements. The joint CEN/ISO Working Group is divided on whether to allow a padded or rigid vertical surface for the *walk-the-walk* activity. In general, all surfaces within the falling space of a forced movement device such as a trampoline shall be impact attenuated.
This paper presents the finding of research undertaken by the University of Technology Sydney to provide the CEN/ISO Working Group with guidance.
The *walk-the-walk* activity is where a trampolinist walks up a vertical wall using a high-performance trampoline to obtain sufficient vertical height and momentum.

Method

Acceleration data was obtained from a triaxial accelerometer mounted adjacent to the trampolinist's sternum. The acceleration data was then fused with video data and analysed.

Results

As can be seen from Figure 1, initially the trampolinist experienced a 1g acceleration which is due to the reaction force from the ground as he was standing on the platform at the top of the wall. While performing on the trampoline which starts at roughly 6 s the trampolinist experienced a very high peak acceleration with a maximum acceleration of approximately 11.5g due to the trampoline reaction force [1], during trampolinist bottom dead-centre location as shown in Figure 2. Between each trampoline reaction force acceleration spikes which can be seen from Figure 1, there are small variable peaks indicating walk-the-wall activities.

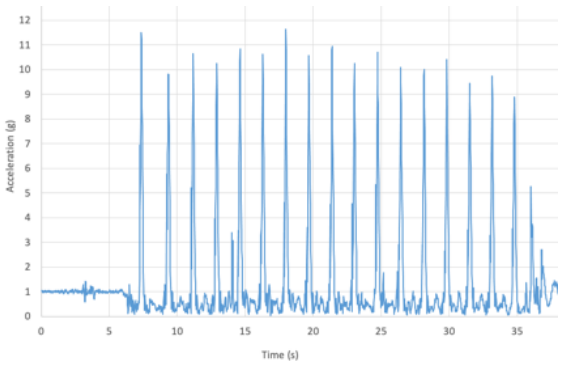

Figure 1: Vector sum of a triaxial accelerometer.

Figure 2: Trampolinist at bottom-dead-centre.

Figure 3: Trampolinist walking-the-wall.

Conclusion

Rigid vertical walls allow the trampolinist to obtain greater control and retain spatial awareness greater than what is achievable a non-rigid surfaces. In the presence of a padded wall, the reaction force from the wall can be considered a variable force, and might not always give the same outcome the trampolinist need to balance with each climb of the wall and fall from the height. It was concluded that unattenuated vertical walls are safer than attenuated vertical walls for *walk-the-walk* activities within trampoline park facilities. Non-rigid walls provide an unstable surface which reduced the trampolinist's control and stability. Control and stability are both critical while performing the complex walk-the-wall manoeuvrer.

References

1. Pendrill, A-M., Eager D. Free fall and harmonic oscillations - analysing trampoline jumps, Physics Education 50(1):64-70, Jan 2015. doi:10.1088/0031-9120/50/1/64.