

The playground surfaces

The importance of the critical fall height.

Arianna Visintin and Gianpaolo Baggio

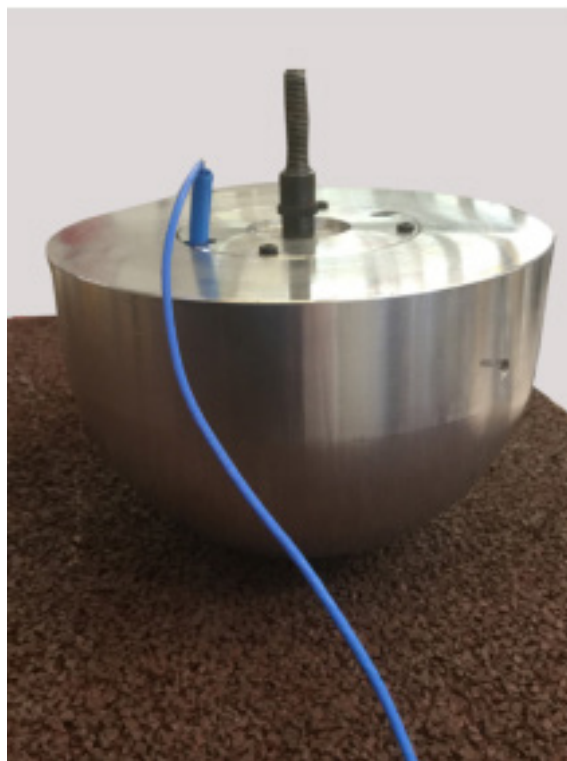
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From some years CATAS is approved by Accredia to carry out the test on the surface of playground equipment according to EN 1177:2018+AC:2019. Into this standard two test methods are defined:

- Test method 1 is used to determine the critical fall height of a surface (maximum height from which it is possible to fall on to a surface receiving an adequate impact absorption),
- The second method checks if the surface is the correct one referred to the playground equipment from which you could fall on it (test on site).

In the past we have already published an article about this standard where we have described how the tests are carried out, so with this article we would represent some data of the tests carried out in our lab by now, because we believe they give an interesting starting point for a critical analysis of these materials.

We have selected the data derived from the surfaces of the same manufacturer, productive process and material but with different thickness. These plots show that the critical fall height increases with the thickness but, at the same time, the curve slope tends to decrease with the thickness.



Headform with accelerometer

These data are collected from samples arrived together to the lab and deriving from the execution of the test according to method 1 of the standard.

These surfaces are casted in place and composed by rubber crumbs with different sizes, glued together. The different granules sizes and productive process are responsible for a different reaction to the impact of the test mass.



Example of rubber surface (section)

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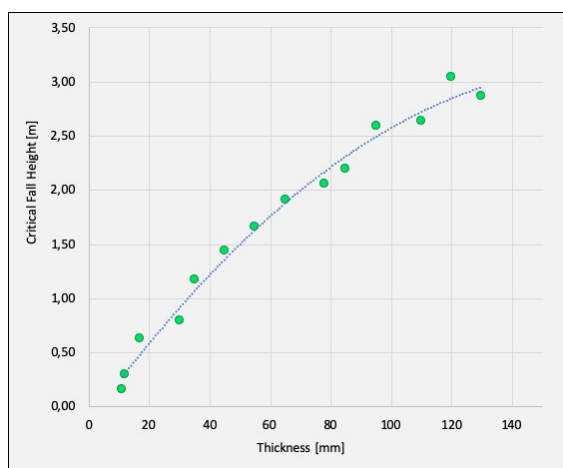
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During the tests these the parameters that are recorded and analyzed are the following:

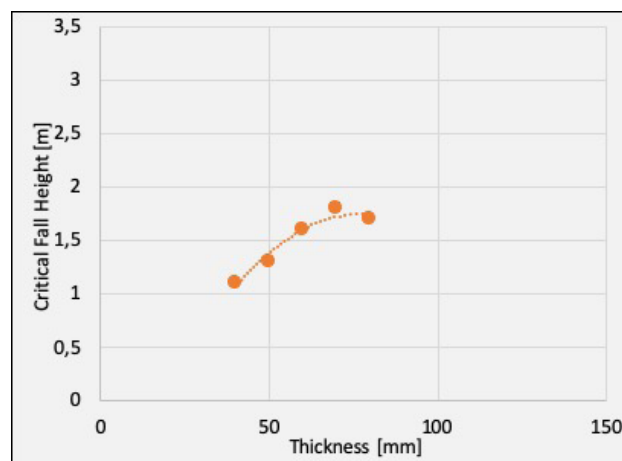
- HIC (Head Injury Criterion) a formula depending on the acceleration and the duration of the impact;
- g_{max} (acceleration);
- duration of the impact.

The final critical fall height shall be the minimum height determined at HIC 1000 or g_{max} 200 (the minimum height between these two parameters) recorded in 9 different points on the same surface.

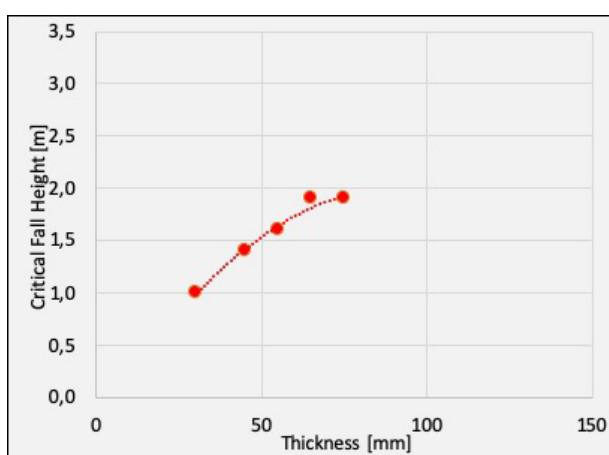
We hope that these data can be useful for further considerations by designers, producers and users.



Graphic 1



Graphic 2



Graphic 3

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