

Test results

Analyzing the impact performance of flexible ice hockey boards

Ice hockey is associated with a high injury risk. Thus, it was analyzed whether new ice hockey board designs are able to reduce the loading of a player impacting the board. It was hypothesized that flexible boards deflect more than traditional designs, and that the loading of a player is thus reduced. In collaboration with scientific service providers, we performed different types of experiments to test this hypothesis on our board.

TEST 2013: Calculation of the energy absorption and board deformation

In 2013, we conducted laboratory test with the Leichtbau-Zentrum Sachsen GmbH (LZS) to determine the energy absorption and the displacement of one single element of our Flexboard PPS.



TEST PROCEDURE WITH 80 kg Pendulum impact test

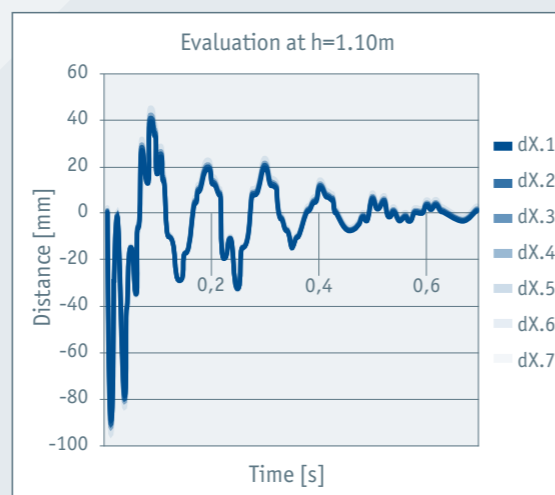
- Pendulum weight: 80 kg
- Pendulum speed: 16.2 km/h
- Impact points: 1.10 and 1.55 m

Comparing the impact velocity and the rebound velocity of the pendulum indicates how much energy is absorbed in the board and the pendulum. The test series was carried out with "Pontos Deformation measurement". The deformation measurement was always carried out at two heights - at 1.10 m and at 1.55 m. The measurement methodology was applied at tempered glass shielding and acrylic glass shielding in equal measures.



RESULTS Results of pendulum impact point of 1.55 m on acrylic shield

- Maximum acrylic glass deformation at 1.55 m: **169.51 mm**
- Maximum board deformation at 1.10 m: **91.80 mm**
- Energy absorption: **87%**



TEST 2017: Calculation of the energy absorption and board displacement

In 2017 the Working Group on Accident Mechanics (AGU Zurich) and the Swiss Competence and Coordination Centre for Accident Prevention (bfu) conducted laboratory tests to verify the energy absorption and displacement of one board element.



TEST PROCEDURE WITH 60 kg Pendulum impact test

- Pendulum weight: 60 kg
- Pendulum speed: 3.37 m/s and 4.6 m/s
- Impact points: 1 m and 1.40 m

RESULTS Energy absorption

Comparing the impact velocity and the rebound velocity of the pendulum indicates how much energy is absorbed in the board and the pendulum.

- Energy absorption with tempered glass: **95%**
- Energy absorption with acrylic glass: **92%**
- Maximum deformation with tempered glass: **49.73 mm**
- Maximum deformation with acrylic glass: **68.80 mm**

Note: The results summarized here are an excerpt from the study which was published in a scientific journal in more detail in 2017.



Laboratory versus reality



The FlexBoard PPS keeps its promise

The tests we made in the past with our Flexboard PPS were carried out under laboratory conditions with a simplified set-up. Influences like the ice surface, low temperatures and longer dasher board elements were thereby not considered. In order to examine those influences on the behavior of our flexible dasher board, we tested again in 2019 with AGU Zurich, this time in an ice arena and under real conditions.

TEST 2019: Calculation of the energy absorption and board deformation in an ice arena

TEST PROCEDURE WITH 60 kg

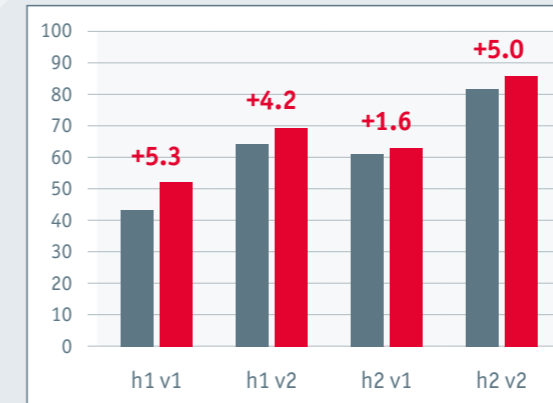
Pendulum impact test

- Pendulum weight: 60 kg
- Pendulum speed: 3.37 m/s (V1) and 4.76 m/s (V2)
- Impact points: 1 m (H1) and 1.40 m (H2)

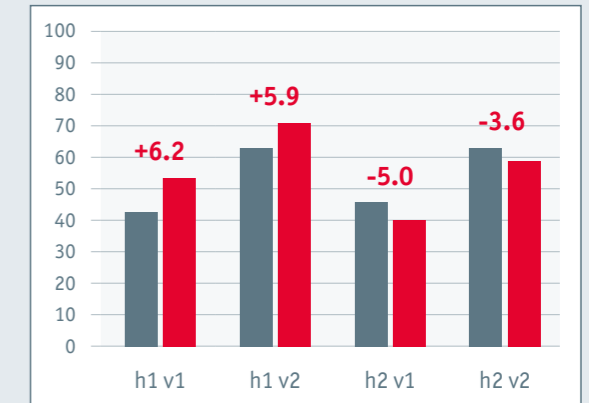
Note: The results summarized here are an excerpt from the study, which will be published in a scientific journal in more detail in 2020.

RESULTS 1

Max. displacement [mm] h=1.4 m



Max. displacement [mm] h=1.0 m



■ = Measured values from laboratory trials in 2017 ■ = Measured values from the arena trials in 2019

Table 1: Comparison of the maximum displacement in laboratory and real conditions in the arena. The difference between the two tests is expressed as a number in millimeters.



• Picture showing test in arena, 2019



• Symbolic picture showing FlexBoard PPS in arena

Comparing different types of flexibilities

There is more than one way to achieve flexibility for dasher boards. On-site impact tests show that there is a marked difference between the values of the various types of boards. These two tables show the difference between the test results for our Flexboard PPS when compared with the results of another type of flexible board. The results confirm the extraordinary flexibility of the Flexboard PPS on both the straight- and the curved sections.

RESULTS 2 / TEST 2019

VALUES ON STRAIGHT BOARD ELEMENT

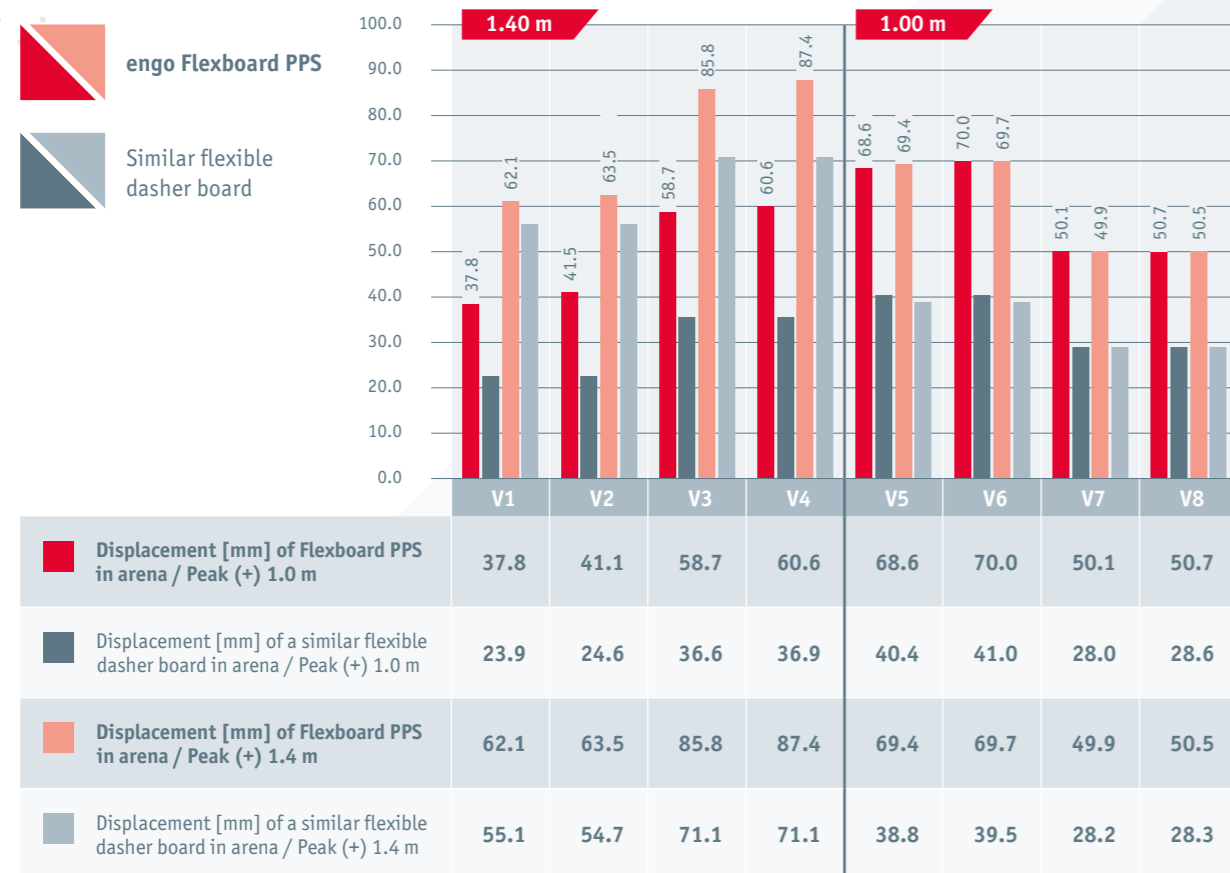


Table 2 + 3:

Comparison of the values of displacement in real conditions in the arena with the PPS board, and the values of another test with a similar flexible board, using the same test procedure and conditions.

RESULTS 3 / TEST 2019

VALUES ON CURVED BOARD ELEMENT

