ImpaKt
Sport Equipment S.r.L.

Impakt Safety Padding Systems for Speed Skating and Short Track Speed Skating
Drop Tests

In the months of June and July 2007 the company Impakt Sport Equipment s.r.l. and Bortolotto s.r.l. presented the prototypes of the protection mats for Short Track and Speed Skating to the University of Engeneering, Mechanical Engeenering Department of Torino for the evaluation of the impact force reduction to be compared with the ISU standard.

The tests were conducted by using a drop test system with the parameter , weight and procedures similar to the one indicated in the ISU rules. Although in several cases pendulum tests are performed the drop test is a very simple test that can be done in many testing centres and allows easy comparison of datas. It takes in consideration also the worst case of collision as a normal body impact would have a distribtuion of the speed and impact zone over the whole body and not a very small part as the drop mass.
As a first step the protection mats with the present ISU specifications were tested. The internal foam material was exactly the same as per ISU specifications. The outside cover was much softer, therefore the results of the ISU mats was better then the real situation based on ISU specifications. This first test evaluation was mandatory to set the testing machine and to be able to compare all the subsequent datas of the new protection mats tested afterwards.

The second scientific test was conducted on the prototype with a width of 50 cm with the code "*Impakt Saftey One*" studied to be used as moveable system without rigid boards. During this test a special frame was placed underneath the mat in order to create the same flexibility, the same movements as the vertical system without boards. This helped to guarantee the real application of the mats and the correct impact force reduction and distribution.
The same mats were placed also directly on the concrete floor to determine the impact force reduction without the use of poles and belts.

Afterwards several mats were tested until finally the 2 best were identified with the requested width of 40 cm studied to be used as normal at the inside of the ice rink boards. These mats have the code "*Impakt Safety Two*". The results were excellent, reaching almost the same values as the 50 cm mats having a reduced width, which can comply with the ISU specifications.

As final solution also a protection mat with a width of 30cm was tested which can be used for Junior level skaters which has the code "*Impakt Safety Three*".

By analyzing the datas, also the test on the speed skating prototype with code "*Impakt Safety Speed Skating*" were excellent reaching alsmost the results of the Short Track moveable system.

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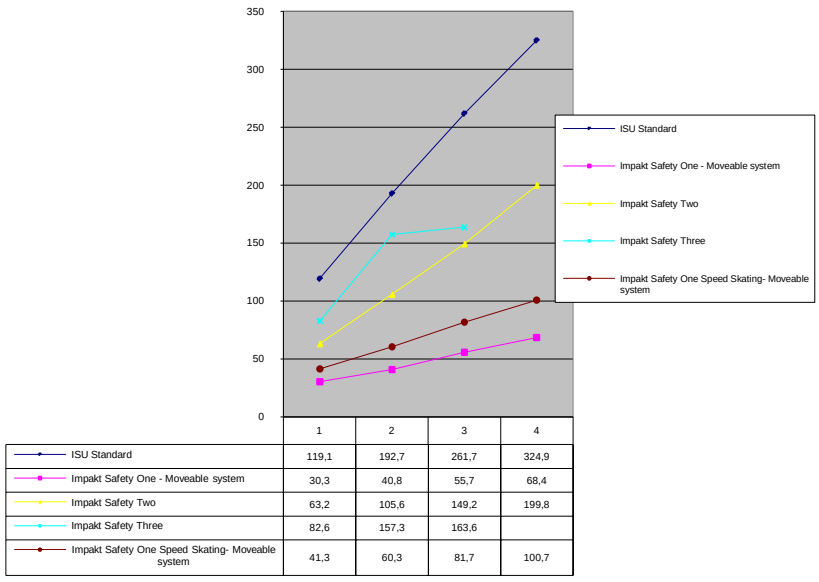
Results

Maximum vertical acceleration measured (**m/s²**)

Model	Notes	H=1m	H=2m	H=3m	H=4m
ISU Standard		**119,1**	**192,7**	**261,7**	**324,9**
Impakt Safety One	Moveable system	30,3	40,8	55,7	68,4
Impakt Safety Two		63,2	105,6	149,2	199,8
Impakt Safety Three		82,6	157,3	163,6	-
Impakt S afety One Speed Skating	Moveable system	41,3	60,3	81,7	100,7

The new mats performed extremely well in comparison to the present ISU standard. Impact forces in drop test were reduced signficantly.
Taking in consideration the max speed the different systems performed as follows:

- *Impakt safety One* the moveable system (OWG Torino) an enhancement of 78,9 % compared to the present ISU standard
- *Impakt Safety Two* an enhancement of 38,5 % compared to the present ISU standard
- *Impakt Safety Three* an enhancement of 37,6 % at a reduced speed and drop height of 3 meters



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Note: lower values are considered as best values for the safety of the athletes.

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As mentioned in the short explanations above the main goal of the new paddings systems studied and manufactured by Bortolotto and Impakt Sport Equipment S.r.l. was to achieve an excellent protection for the athletes which would allow them to have a soft impact and avoid the dangerous bounce back effect which could result in other severe injuries by being pushed back to the racing lane.
A couple of sequences of images will clearly show how the mats are working and how the athlete will remain close to the protection mats.
It is not the intention to show images of low standard safety products and the severe injuries that might be a consequence of not being able to absorb the impact force nor is it the intention to give comments on other products available on the market.

It shall also be understood that no system although being at high level, may cancel completely the risk of injuries, but it should be the intention to reduce this risk to a very low percentage

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