DEVELOPMENT OF A SHOE/ICE SKATE COMBINATION FOR YOUNG CHILDREN TO LEARN ICE SKATING IN A PLAYFUL AND PROPER WAY

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In the ice skating world, learning the first principles of ice skating is ideally executed in a rather playful but proper way, where the existing types of ice skates do not allow young children to do so. Also, young children do not bother to run and play on the ice floor while wearing their casual shoes, or walking on regular floors outside the ice floor while wearing ice skates. This first situation could bring outside dirt on the ice floor which might lead to dangerous situations like stumbling of other skaters, whereas the latter situation could damage both the floor and the ice skates.

Client Piet van Oosterom had the wish to find a solution for these problems, in the form of a physical product; a 'hybrid product', especially meant for these young children, which could function as both a shoe and an ice skate. Besides that, the design of this product should allow for easy alternating between ice skating on ice floors and regular walking on normal floors. Another learning aspect is that the product should challenge the user of ice balancing the ankles on a wobbly product, which is also the case when for conventional ice skates.

By making use of insights from biomechanical aspects, important differences of the position of the feet were found between walking, running and ice skating. Based on that, the idea rose to design the product in such a way that it only functions as an ice skate when the user specifically tilts his or her leg, a position which is common during the 'push-off'-moment on the ice floor. When the user keeps his or her feet straight during walking and running on normal floors, the product should behave as a normal shoe. A special shape was found which satisfies these different use situations, shown and explained in the figures below:

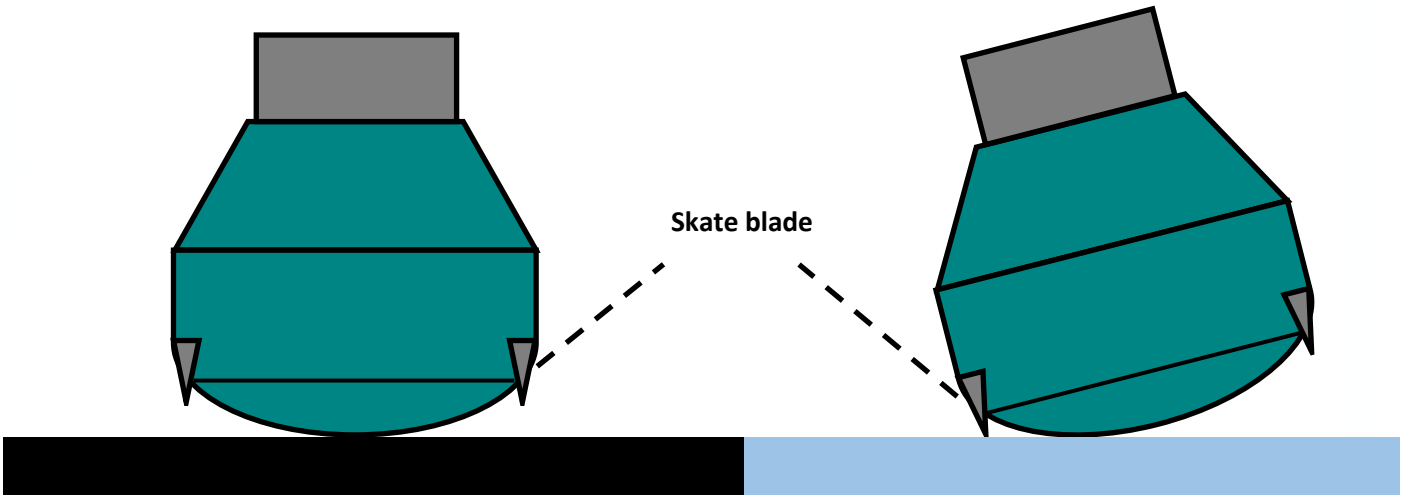

Figure 1

Foot is kept straight, skate blade does not touch the floor.

Figure 2

Foot tilts, skate blade touches the floor (ice floor).

As a final result, a promising and realistic looking product idea has been created to potentially fill this market gap. By making use a well thought-out product shape, the designed product is a good match between the functional aspects of both an ice skating and shoe, while allowing the user to get ice skating experience in a playful, safe and proper manner. The product is meant be used in combination with the own shoes of the user, which makes the product design universal in use and skips additional research- and production costs for the development of an integrated shoe. By having designed the ability for adjusting the product in size, the user can 'grow with the product' and the product can be easily shared with friends or siblings. By making use of strong, lightweight and re-usable materials - such as aluminium, spring steel and thermoplastic polymers - and by leaving away any complex mechanisms, the design can take a beat which is ideal for all adventures of a young child. Due to symmetry of the main body of the product, the product fit either the right foot and left foot, which lowers developing costs and production costs by leaving away the urge of developing both a separate left- and right foot configured product.

The estimated production costs of about €75 per product pair is on the rather high side. In next phases, the product design could be simplified, by reducing the number of parts in order to reduce the total number of production steps and thus production costs. When bringing a consumer product to the market, it will also need several test phases in order to test (and improve) its performances and for getting national approval in the fields of safety, health and environmental impact. Therefore, in next phases a combination of prototype testing in real user situations and computer simulations could help testing the product's performance and durability. It would be especially interesting to get know user experiences, in order to know in what level the product properly allows the user to learn the principles of ice skating and how the product is experiences when wearing outside the ice floor.