INSTRUMENTED SKATE

REAL-TIME FEEDBACK FOR AN IMPROVED SPEED SKATING PERFORMANCE

For every individual skater, there is probably an ideal skating stroke. For the first time, it has become possible to get a complete view of a person's skating position by using 3D imaging. This is important, because it allows us to discover which skating stroke would work best for each individual. Doctoral candidate Eline van der Kruk went to the Thialf ice rink at night in order to take measurements for and test her computer model, which is designed to predict which skating stroke is best suited to each individual skater. In the early morning, several top skaters, including Olympic champion Lotte van Beek, skated along a section of ice wearing a high-tech measuring suit and TU Delft's measuring skate. They covered about 50 m of ice, while high-tech cameras formed a 3D image of each skater.

Another step towards the ideal skating technique

Eline van der Kruk: "The basic idea is that there is an ideal skating stroke for each individual. For example, if you have a specific body build, should you push off early in the skate stroke? The 3D information that we are getting at Thialf will give us valuable new information about skating strokes and styles. This will allow us to improve the measurement skate and the computer model. It will form an interesting tool for training in preparation for the 2018 Olympic Games."

Computer model

All the data from the measurements are used to for a computer model that van der Kruk is developing, and on which she graduated cum laude. 1

Partners

This research was sponsored by Thialf, Moticon and Qualisys. The research project was funded by STW and is executed by TU Delft, VU Amsterdam, The Hague University of Applied Sciences, InnoSportLab Thialf, KNSB and Thialf

TU Delft scientific expertise

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More information

skatescience.nl

The model aims to simulate the optimum skating performance, enabling a skater to see how they could best push off with the skate, or what the optimum knee angle would be. By entering specific characteristics such as body build and weight, the computer model can then predict the effects of small changes (such as the angle of the knee) on the performance of an individual skater.

The computer model is highly innovative, because researchers can make predictions – instead of just analysing the movements afterwards. For skaters, it is particularly useful to have an accurate and flexible computer model into which all kinds of variables can be entered. This is more accurate and practical than asking a skater to do twenty circuits with a knee angle of two degrees more or less, while trying to keep the rest of their body constant.

High-tech Swedish measuring system

The team from TU Delft is working with the Swedish company Qualisys, which specialises in motion capture, to set up the ice rink and make the optimum measurements, allowing them to create a 3D visualisation of the skate strokes. The skaters wore their own suits with special sensors ('markers') attached to them, and the 'measuring skates' while skating on the ice. The data from the measuring skates, the measuring suit and the camera images were combined in order to calculate the optimum amount of force that should be used and the point at which the skater should push off within the skate stroke.

" THROUGHOUT OUR LONG TERM RELATIONSHIP WITH TU DELFT, WE EXPERIENCE THAT TU DELFT TRULY BRIDGES THE GAP BETWEEN THEORY AND PRACTISE. WHEN WE AS THE KNSB DEFINE A CHALLENGE THAT WE FACE IN OUR SPORTS, TU DELFT RESEARCHERS ARE REALLY COMMITTED TO COMING UP WITH SATISFACTORY SOLUTIONS. WE CAN SENSE THAT TU DELFT, LIKE US, WANTS TO EXCEL. TU DELFT HAS PROVEN TO BE A PARTNER THAT SINCERELY WANTS TO CONTRIBUTE TO OUR GOAL OF WINNING GOLDEN MEDALS. FOR US, THE ACTUAL TESTING ON THE SKATE COURT AND FOR THE SKATERS HAVING REAL-TIME FEEDBACK ON THEIR PERFORMANCE AVAILABLE IS KEY. WE ARE VERY SATISFIED WITH HOW TU DELFT RESEARCHERS CONTRIBUTE TO THAT".

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EMBEDDED SCIENTIST SHORTTRACK
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