Hack to the house: Scientist's mathematical model shows why a curling rock curls

Sadly for University of Alberta professor emeritus Ed Lozowski, his latest foray into the dynamics of ice friction may never be classed as performance-enhancing mathematics for curlers.

By Juris Graney | Published on: December 11, 2017

His groundbreaking paper, co-authored with University of Northern British Columbia professor of physics Mark Shegelski and published in early November, is the first mathematical model that explains just how a curling rock makes its way from the hack to the house.

But the former ice researcher in the Department of Earth and Atmospheric Sciences is quick to point out that those trying to exploit his findings for competitive gain may come up with a blank end.

“All of the parameters that might help improve the game have already been discovered by trial and error by people who have practised the game over centuries,” he said last week.

“I wish I could say here is the magic ingredient you need in order to make the game better but, right now, I don’t really have any suggestions.”

Lozowski first started pondering ice friction during his sabbatical from the University of Alberta at the National Research Council back in 2003. While working on the problem of aircraft ice accretion, his mind began to wander into the realms of sports and ice friction.

“The whole point of sabbatical leave is that it should afford you the opportunity to let your mind wander a little,” he said.

As a former speed skater — he is quick to point out that he was “not a very good one” — he began to think about why ice is slippery and how he could express it scientifically. That led to similar scientific journeys into the sports of bobsledding and skeleton.

Then he turned his mind to curling and how the rock interacts with the pebbled surface of ice.

What produces the curl, Lozowski’s paper posits, is slip-stick friction, an effect that can be seen if you run your finger across the tips of the teeth of a comb. As your finger moves across the surface, each of the teeth deflects a little bit, loses its grip and snaps back into place.

“When a curling rock encounters pebbles, it essentially does the same thing, but because it is rotating when it catches the top of the pebble, it tends to pivot about that pebble and the pivoting changes the direction of motion of the rock,” he said.

Lozowski said the most crucial part of this equation is not the stone nor the curler, but the icemaker who can control the size and shape of the pebbles.

That’s why the only way it could be possible to harness his findings would be if someone could find a way to photograph or document the ice, scan those photographs and quickly put them into a computer and determine the number and size of the pebbles.

“My hat’s off to those who actually play the game because they have already discovered those possibilities,” he said.

Source: Edmonton Journal