

## **Guest Editorial**

### SPECIAL ISSUE ON SPORTS ENGINEERING – 2

This issue contains ten papers that form the second part of the special issue on Sports Engineering. Each paper in its own way is outstanding. They show the diversity of the activity that comes under the heading of sports engineering, and yet they have a unity in that they all address questions that have arisen from actual experience, none more so than the first paper by Nigel Mills on the design of bicycle helmets. This is a topic that has occupied Dr Mills for many years, and the range of experience he brings to this study – which combines finite-element modelling, user input, materials technology, and experiment – is formidable.

The second paper by Peter MacKenzie and Gareth Bradley is a response to a quite different challenge, that of devising a new material that has the property of being metastable, that is, it can be a solid or mouldable at the desire of the user, who may wish to customize a splint or a shin guard. The next two papers arise from the work of the Edinburgh Ice Mechanics group led by Jane Blackford, in which they looked first of all at the fundamental science behind the use of sweeping the stone in curling and also developed an instrumented broom to assist in the development of technique. Although these papers are of a purely technical nature, their application abuts the verges of applied psychology, as does the paper by Gillian Mara, Andrew Harland, and Sean Mitchell on the modelling of a prosthetic foot to improve footwear testing. Designing new shoes is almost the easy part nowadays – the real question is how the customer in all his/her variability will take to the new design, and this study is a step on the road to a logical process.

The next paper moves even further towards the integration of psychology with the technical aspects of sports engineering, in the shape of work by Jonathan Roberts and his colleagues at Loughborough on the players' perception of equipment quality as assessed through the sound and vibration experienced on impact.

We then have a set of three papers that explore the impact behaviour of equipment – in the case of Claire Davis and her colleagues at Birmingham, it is the dynamic performance of golf club shafts in relation to the choice of materials. Richard Brooks, Stephen Mather, and Stephen Knowles have looked at the vibration response of cricket bats as they are, and as they might be, to make the ball go even further, whereas the group from Bath – Sam Fisher, Jeff Vogwell, and Martin Ansell – has looked at the hand loads and the location of the centre of percussion as a function of the structure of the bat.

The final paper looks at the modelling of a hand-stitched football, as used in elite competition. The aim is to understand the performance of the ball in order to inform decisions as to potential changes in the design. As the authors – Daniel Price, Roy Jones, and Andy Harland – say, in an era where the international market for sports goods is both large and competitive, it is vital to know how to obtain competitive advantage, yet stay within the rules of the governing bodies.

The production of the two parts of this special issue has been a revelation to both of us. We would like to express our thanks to the Institution, to the Editorial Board, and to the Editor for enabling the sports engineering community to showcase its wares in the journal.

Colin Walker  
University of Strathclyde  
Sadayuki Ujihashi  
Tokyo Institute of Technology