Rowing Applied Session @ ISBS 2009

Aim
The aim of the Rowing Applied Session is to see how an understanding of rowing biomechanics and applying technology can help to improve rowing performance. The presenters will introduce some concepts, controversial issues, demonstrations and methodologies which will be the focus for discussion among the participants.

The Basics
The rower works against hydrodynamic and aerodynamic drag. Drag is roughly proportional to the square of the boat velocity, and the greater the net force the rower applies to the boat the greater will be the boat velocity. The mechanism for applying theses forces is made all the more intriguing due to the oscillatory motion of the rower in producing the drive and recovery phases of the stroke. The rower applies force to the pins via the oar and the stretcher. During the drive phase, the net force applied to the boat is the difference between the pin force and the stretcher force while during the recovery phase it is mainly the stretcher force. Blade and boat hydrodynamics constantly change due to the changing position of and application of forces by the rower. The aim of our biomechanical studies is to understand how all these variables affect performance and channel the power output of the rower optimally into boat propulsion.

Firstly, in this Applied Session we will assess how to get the best value from various technologies that can supply the quantitative information needed for informed decision making about technique. We do this first as the following sections depend on collection of data using the equipment. The next two sections will examine various combinations of these variables as they apply to large and small boats and simulation of rowing.

Section One – Technology (Richard Smith and Valery Kleshnev)
What is the best value for money in rowing instrumentation?
We will look at the value of simple instrumentation such as accelerometry, oar angle measurement, handle and pin force through to complex three dimensional measurement of pin and stretcher forces, rower segment and oar position.

Section Two – On-water Rowing Performance (Valery Kleshnev and Richard Smith)
Large boats
What are the determinants of performance peculiar to the large boats?
Are there seat-specific differences in performance requirements in fours and eights?
Small boats
The pair - Should a pair rower learn to row in a given seat or should they be selected for their ‘natural’ force production technique?
Sculling - Even sculling is asymmetric. Is this detrimental ? How do we deal with asymmetry in rowing?

Section Three – Rowing simulation: (Peter Sinclair)
How specific are popular rowing ergometers to on-water rowing?
How do handle force, stretcher force and handle velocity differ between ergometer and on-water rowing?
Sliding vs fixed ergometry and discussion on the indoor rowing tank.

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Presenter Biographies

Richard is currently working with the Australian Institute of Sport and other partners to advance the quality of rowing performance measurement systems. He is an Associate Professor at The University of Sydney, Australia and also works with the New South Wales Institute of Sport on projects in the biomechanics of water sports. He is particularly interested in the mechanisms of rower power generation and its efficient transfer to boat propulsion. He has been studying the biomechanics of rowing for twenty years, published in international journals and has been successful in attracting competitive grant funding for research projects including rowing.

Peter Sinclair has a PhD degree from The University of Sydney and completed earlier studies at The University of Western Australia. He has lectured in Biomechanics at The University of Sydney since 1990, and is currently sub-dean of Graduate Coursework and Students. Peter was the founding chair of the Australian and New Zealand Society of Biomechanics. His research crosses a range of topics in Sports Biomechanics and has been conducted in collaboration with both the Australian and New South Wales Institutes of Sport. Peter is also interested in computer simulations of muscle performance, particularly where applied to cycling exercise for people with spinal cord injury.

Valery Kleshnev spent 10 years as a member of USSR National Rowing team, achieving Junior World Champion, Olympic Silver, World Bronze, and four National Championship titles. Valery has a Masters Degree from Leningrad Academy of Physical Education and a PhD in biomechanics of rowing and coaching science from Leningrad Research Institute of Sport. He has worked in Saint-Petersburg Institute of Sport, the Australian Institute of Sport, and the English Institute of Sport. Since April 2009 he continues his support to British Rowing as a private consultant. The main area of his research interest are rowing biomechanics and its application in coaching. He has published more than 120 papers, publishes the Rowing Biomechanics Newsletter, and publishes www.biorow.com. Valery has invented and developed more than 100 devices and programs for measurement, data analysis and feedback. The current research directions are rowing efficiency and ergonomics.