

NICON

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BEYOND MOTION

CASE STUDY



Driving
English cricket
forward with
Loughborough
University



DRIVING FORWARD THE FUTURE OF ENGLISH CRICKET WITH LOUGHBOROUGH UNIVERSITY'S NATIONAL CENTRE FOR SPORT AND EXERCISE MEDICINE

Consistently ranked as one of the world's best places to study sport, Loughborough University is home to the School of Sport, Exercise and Health Sciences, and boasts a large concentration of elite facilities across a wide range of disciplines. Therefore, it's no surprise the establishment has a long-standing partnership with the England and Wales Cricket Board (ECB) and they are working together to make ground-breaking changes within the sport.

The School is based at the National Centre for Sport and Exercise Medicine (NCSEM), where the ECB has access to cutting-edge research, technology and equipment. This allows the ECB to blend science and sports performance to inform their coaching methods to ultimately improve technique and reduce injury risk.

VICON POWERED

Loughborough University is a long-standing Vicon customer and has been using motion capture systems since the late 1990s. The NCSEM is the latest facility there to do so and this purpose-built hub opened in 2016, with cutting-edge motion capture equipment from Vicon. As an Olympic legacy project, the NCSEM uses the Vicon system to deliver education, research and clinical services in sports, using the knowledge gained to understand, predict and push the boundaries of athlete performance.

The system at the NCSEM uses Vicon Nexus software and 28 Vicon MX13 and MX-T20 cameras split over three labs. In addition to the main lab, the building also comprises a Computer Assisted Rehabilitation ENvironment (CAREN) from Motek, a disability sport lab, a 3T MRI scanner, and an extensive array of training equipment.

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PUSHING PERFORMANCE

Kevin Shine, ECB National Lead for Fast Bowling for the last 12 years, uses the outputs of the Vicon system on a regular basis to deliver highly individualized talent management programs. He comments: "We have had a lot of bowlers come through our process over the years. What we've learnt is that every single bowler is different. This means we need to be able to employ unique, personalized training regimes that push each individual's performance envelope. The Vicon system is part of our pathway for bowlers, helping us identify talent, improve performance and prevent injury.

"The Vicon system helps us to understand the how and why of our bowlers' technique. It provides the highest quality of data and the gold standard in analysis, enabling us to help our bowlers become faster, more skillful and less susceptible to injury. Training shouldn't be laborious, and we encourage our players to be curious about their performance. Using the Vicon system over the last 13 years has helped us change our explicit training techniques; we have analyzed which training drills will be most effective in real-life performance and then put them into practice."

Of course, determining the best performance techniques goes hand-in-hand with keeping bowlers at their best, and this includes minimizing the risk of injury and speeding return from injury. The school has adapted the marker set that it uses to increase the detail captured from the lower back, as bowlers are susceptible to lumbar stress fractures. For Professor Mark King, Lead Academic in Sports Biomechanics at the School of Sport, Exercise and Health Sciences, Loughborough University, understanding the cause of injuries and how to prevent them is a vital outcome. He comments: "The Vicon system tracks bowlers very well and is also portable – we've taken it out in the field to capture a more natural technique and improve the quality of data we're capturing.

"We're using this data to look at the bowling action and how the hips and shoulders move, influencing what's happening in the lower back. We also look at the front foot and how it is combined with technique. The data that the system provides has not only helped us to reshape our knowledge of injury but also refine and enhance coaching techniques.

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"On the back of this, we're conducting a number of PhD research programs. The system's modeling can help predict factors that drive pace or injury, which are then validated by the extensive research. This, in turn, is feeding into an important piece of work that's under way to improve the future of cricket: an update of the ECB's bowlers' guidelines to help minimize injury risk."

Other sports are also benefiting from the ground-breaking work at NCSEM. Paul Felton, former Research Associate at the School of Sport, Exercise and Health Sciences, Loughborough University, said: "The NCSEM was built with cricket in mind and is a fantastic facility that enables research on performance and injury to inform the way the sport is coached and managed. The Vicon motion capture system allows us to understand the characteristics of bowling technique, but the repeatable process means that we can also apply it to other sports. A huge amount of research has been done in the main and CAREN labs around golf, tennis and badminton techniques, providing huge potential to further understand and improve sports performance."

UNPRECEDENTED LEVELS OF DATA

Sharing unprecedented levels of data is fundamental to NCSEM's success. Pete Alway, PhD Student at the School of Sport, Exercise and Health Sciences, Loughborough University, comments: "The Vicon system allows us to collect data we quite simply couldn't do before. The science does move on and we're now using it to show cricket coaches that they can tap into its benefits easily – without any specialist knowledge of the technology involved – to improve pace or prevent injury. We share the 3D output of the capture sessions and our modeling with the coaches, and we are looking to enhance this by adding video overlay too. Because of the long history of the lab here at Loughborough, we can also look back at performance over time and carry out repeat testing of players. What we have learnt is that small changes in technique can have a major impact on performance."

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