

# The instrumented scrum machine: A coaching tool for quantitative analysis

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The ability to quantify performance in training provides a huge advantage to the coach as objective data can be used to guide coaching decision-making. The High Performance Centre has partnered with the University of Pretoria's Department of Mechanical and Aeronautical Engineering and the Institute for Sports Research to develop a device that can be used by rugby coaches to assess scrumming performance.

A conventional scrum machine used in training by Tuks Rugby was redesigned and modified to allow the integration of force sensors into the the scrum machine. Using the force sensor measurements and the laws of physics, 3-dimensional forces and moments are obtained when scrumming against the instrumented scrum machine. In other words, the instrumented scrum machine measures the forces (i.e. forward, up-down and sideways) produced by a pack of forwards (or single players if they are training individually) as well as the turning moment (i.e. the moment responsible for rotating the scrum clockwise or anti-clockwise) of the scrum.

Such information can be used as a coaching and training tool to assess changes in a player or pack's performance over time, to monitor performance within a training session, to provide feedback to a player to facilitate technical improvements, and to assess whether a player has returned to their pre-injury condition following an injury.

Through scientific research, questions on scrumming technique, conditioning, fatigue, and safety can be investigated using this device. The research team is currently conducting a project to investigate the influence that varying foot positions and body kinematics (ankle, knee, hip and trunk angles) have on force production during the scrum.

To our knowledge, this is the only instrumented scrum machine, capable of providing 3-dimensional force and moment data, in South Africa. Development of the device is ongoing, with future plans to create a tablet-based interface providing real-time feedback to the coach.