

FRICIONAL INTERACTIONS BETWEEN HANDS AND SPORTS EQUIPMENT

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ABSTRACT

The frictional interactions between hands and sports equipment play a key role in carrying out high performance tasks in a safe and controlled manner. These interactions are often highly complex due to the non-linear loading behaviour of human skin and materials involved and the presence of surface contaminants or products that are designed to modify friction.

This paper will describe the key experimental phases used in a number of case studies on the topic of hand-sports equipment interaction, namely: generating boundary test conditions; the replication of real-world loading scenarios in a repeatable test methodology; experimental design to include relevant input

parameters; testing and analysis of data; modelling interactions using tribological mechanisms; and linking back to real-world context. The case studies cover interactions related to rugby ball handling, rock climbing, gymnastics and wheelchair racing. The effects of object surface material and texture; moisture and contaminants; friction modifiers such as chalk and the use of gloves will be discussed, based on the outputs from various studies.

Different tribological mechanisms and modelling will be used to explain the different trends observed. Finally the real-world effect of different parameters will be discussed in a context that has impact on sports equipment manufacturers and sports participants.