

Inexpensive Digital Apparatus to Observe Reaction Time and Force of Tumble Turn Swimming Movement

K.H.S.M. Kumarasinghe* and. A.W.S. Chandhana

Department of Sports Sciences and Physical Education, Faculty of Applied Sciences, University of Sabaragamuwa, Belihuloya, Sri Lanka

*Sahankumarasinghe27@gmail.com

Doing the fast and effective Tumble turn is one of the most critical skills that makes a faster swimmer over longer distances. The Force and reaction time is very important to perform accurate tumble turn in swimming events. The aim of this research is to an apparatus that can measure the force and reaction time of a swimmer. In Sri Lanka, there are many talented swimmers but not enough facilities to measure the reaction time and the force of tumble turn. The force describes as a push or pulls upon an object that causes to change the direction of the swimmer. The Reaction time shows the ability of the swimmer to respond in a quick turn. Arduino and Thing Speak software needs to design digital circuits of apparatus. The Laser sensor and receiver are connected 3 m distance away from the wall. The swimmer entered a 3 m zone; the timer will activate. It will measure the duration of the tumble turn when the swimmer leaves the 3 m zone. The force sensor ($F=2000N$) is attached to the wall to measure the force. When the swimmer touches the wall with the legs, the force calculates from the apparatus. School-level team ($n=10$) swimmers were used to observe the reaction time and Force corresponding to the tumble turn. Also, the high-speed camera (50Hz) was used to determine the kinematic of the movement's patterns of the tumble turn to measure the validity of the data. The analyzed average force and reaction time of the participants were Force (4.14N) and Reaction time (6.507s) respectively. The reaction time and force of the tumble turn can measure through this inexpensive digital apparatus in any practical session of tumble turn.

Keywords: *Apparatus, Force, Reaction Time, Tumble Turn, Swimming*