

MODELLING ENERGY EXPENDITURE AND RECOVERY IN CYCLING

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Models of fatigue are based on physiological parameters such as critical power (CP) and anaerobic work capacity (AWC). CP is a theoretical threshold value that a human can generate for an indefinite amount of time and AWC represents a finite expendable amount of anaerobic energy at intensities above CP. There is an increasing interest in developing mathematical models of energy expenditure and recovery for athletic training and human performance. The objective of this research is to propose and validate a model for recovery of AWC during a post exertion recovery interval of cycling. A cycling ergometer study is proposed which involves a VO₂max ramp test to determine gas exchange threshold, a 3-minute all-out intensity test to determine CP and AWC, and exertion-recovery interval tests to understand recovery of AWC. The results will be used to build a human in the loop control system to optimize cycling performance. This research could be extended to improve mission planning of soldiers by modelling an energy and resources management system. Furthermore, this research could provide valuable insights to human perception of exertion and exercise-as-medicine and thus lead to prevention of particular health problems.

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