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Simulation of Optimum Sculling Angle for Adaptive Rowing

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Abstract : The purpose of this paper is twofold. First, we believe that there are a significant relationship between sculling angle and sculling style among adaptive rowing. Second, we introduce a methodology used for adaptive rowing, namely simulation, to identify effectiveness of adaptive rowing. For our study we simulate the arms only single scull of adaptive rowing. The method for rowing fastest under the 1000 meter was investigated by study sculling angle using the simulation modeling. A simulation model of a rowing system was developed using the Matlab software package base on equations of motion consist of many variation for moving the boat such as oars length, blade velocity and sculling style. The boat speed, power and energy consumption on the system were compute. This simulation modeling can predict the force acting on the boat. The optimum sculling angle was performing by computer simulation for compute the solution. Input to the model are sculling style of each rower and sculling angle. Outputs of the model are boat velocity at 1000 meter. The present study suggests that the optimum sculling angle exist depends on sculling styles. The optimum angle for blade entry and release with respect to the perpendicular through the pin of the first style is -57.00 and 22.0 degree. The optimum angle for blade entry and release with respect to the perpendicular through the pin of the second style is -57.00 and 22.0 degree. The optimum angle for blade entry and release with respect to the perpendicular through the pin of the third style is -51.57 and 28.65 degree. The optimum angle for blade entry and release with respect to the perpendicular through the pin of the fourth style is -45.84 and 34.38 degree. A theoretical simulation for rowing has been developed and presented. The results suggest that it may be advantageous for the rowers to select the sculling angles proper to sculling styles. The optimum sculling angles of the rower depends on the sculling styles made by each rower. The investigated of this paper can be concludes in three directions: 1;. There is the optimum sculling angle in arms only single scull of adaptive rowing. 2. The optimum sculling angles depend on the sculling styles. 3. Computer simulation of rowing can identify opportunities for improving rowing performance by utilizing the kinematic description of rowing. The freedom to explore alternatives in speed, thrust and timing with the computer simulation will provide the coach with a tool for systematic assessments of rowing technique In addition, the ability to use the computer to examine the very complex movements during rowing will help both the rower and the coach to conceptualize the components of movements that may have been previously unclear or even undefined.

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