THE SPEED DISTRIBUTION OF HORSE RACING IN 1200 METERS

Shuping Li, Lin Li and Jiang Tao

School of Physical Education, Hubei University, Wuhan, Hubei 430062, P.R.China

The purpose of this study is to investigate the speed distribution models of horse speed racing in 1200 meters. 900 horses in 1200m speed racing were investigated. When divided the 1200m equally into three 400m sections, it showed there are two models were employed by most winners: slow-medium-fast and medium-slow-fast. The relative lager variation of the velocity coefficients in the third section indicated that the coordination of horse and jockey in the spring stage should be improved.purpose of this study was to identify the causes of rejection of papers from conference

KEY WORDS: speed coefficient, jockey-horse system, coordination.

INTRODUCTION: Horse speed racing is a periodic motion of physique dominated event. One of key factors is how a jockey controlling the speed distribution in the racing according to his/her horse's ability as well as the levels of competitors. According to the view of technique, either the jockey's skill level or the style of riding may affect the interaction between jockey and horse (Pfau, et al., 2009). For an experienced rider, there was better adaptation to the movement pattern of the horse (Schöllhorn et al., 2006; Li et al., 2009). The purpose of this study is to investigate the speed distribution models of horse speed racing in 1200 meters and provide reference of improving riding skill for jockeys.

METHODS: 900 horses of all 93 games of 1200 meters during the 2012-2013 season in the Sha Tin Racecourse of the Hong Kong Jockey Club were investigated. The distance of 1200 meters was divided equally into three 400 meters sections to analyze the average racing times. According to the average time of three sections, the speed distribution could be obtained. Speed coefficient was used to analyze the relative velocities relations of each section and whole distance.

RESULTS: It was showed three types of models were employed.They were slow-medium-fast (SMF) model: slowest in the first section and fastest in the third section; medium-slow-fast (MSF): slowest in the second section and fastest in the third section; and medium-fast-slow (MFS) models: slowest in the third section and fastest in the second section. The data analysis showed that the speed distribution characteristics of most horses (jockeys) among the top four horses were SMF (45.7%) and MSF (53.5%) model. It is interested that all of the first and second place horses run with the SMF and MSF models. The use of two modes is in the same proportion.

DISCUSSION: The Dimensionless coefficient, velocity coefficient E, was introduced to understand the relative velocities between each section V_{si} and whole distance V :

$$E = \frac{V_{si} - V}{V} \times 100\%$$

i =1,2,3

The results showed that in the first section, the velocity coefficient of all top four horses were lower than zero. It indicated that the average velocities of the first section were smaller than that of whole distance. This result was consistence with the characteristic of the first section,

a horse accelerating gradually from a standstill. In the second section, the velocity coefficients of most top four horses were higher than 0. Though there are few velocity coefficients of horses lower than 0, but close to 0 ($E = -0.02 \sim 0$). The velocity coefficients in third section were similar to the second section but the variation was larger than that of the second section. The number and value of velocity coefficients which lower than 0 were more than that of the second section. It indicated that the controllability of some horse (jockey) were not stable in the sprint stage.

CONCLUSION: Most of horses employed two models: SMF or MSF. Though 1200m racing is an anaerobic motion for a horse. The velocity distribution is still a notable problem. All horses run fastest in the third 400m section. The stability of horse-jockey coordination is needed to pay attention in the sprint stage.

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