DYNAMICS ANALYSIS ON REFLEXED BOW

Jihe Zhou, Yuqing Shi, Xiaoan Long, Shanfeng Gao and Detao Zeng
Chengdu Institute of Physical Education, Chengdu, China

KEY WORDS: reflexed bow, foil gauge, time domain, frequency domain

INTRODUCTION: Reflexed bow and composite bow competition are two main categories in shooting game. Nowadays, only reflex bow competition is in Olympics game. Therefore, we choose the reflex bow as our test object. According to the literature we collected. Up to now, There is no experiment carried out on dynamics analysis on reflex bow .so we make some efforts on this field. We attempted to have a further understand on it and hope to make some useful suggestion on archery athletics, help them to understand bow's feature and improve their results.

METHODS: Two elite athletics (Male) and 2 ordinary athletics (Male) participated in this study. The bow is HOYT manufactured by U.S.A. All 4 athletics shoot off the target 15m, we paste foil gauge and acceleration sensor on two different part respectively. The signal was magnified A/D convert and then input in to a computer, and the data were processed by special software.

RESULTS AND DISCUSSION: Through testing the process of the athletics shooting, the shooting original data were processing, then analyze the acceleration sensor and foil gauge time domain characteristics value, and frequency value, and we know, 3 among 4 persons' acceleration mean value are 0.012 v, 0.066 v, 0.013 v respectively. When draw length is shorter, the acceleration is smaller, acceleration mean value is –0.002v.From the foil gauges' time domain characteristics value shown in the graph, we found that there are no regular pattern in theirs peak to peak value of time domain and mean value between elite and ordinary athletics. From the frequency domain value shown in the graph, we found that the elite athletics' acceleration's frequency is higher while spectrum value is familiar.

CONCLUSION: Through the dynamics data test in the target bows, we preliminarily draw some conclusion as follows:
1. When the draw length is getting longer, namely the athletics use the longer arrow, bow's acceleration's time domain and the mean value is higher.
2. Whether the draw length and the mean value are higher. There is no regular pattern between the gauges' peak to peak time domain and mean value.
3. The elite athletics' sensor frequency domains peak frequency are lower, appropriately 200 HZ, ordinary athletics peak frequency is higher, appropriately 300 HZ.

REFERENCES:
Li, liangbiao. J. (1987). *Sports Biomechanics.* Beijing Institute of Physical Education, (3): 25-27.