THE DYNAMIC EXPERIMENTAL STUDY ON ABSORBERS OF THE RECURVE BOW

Jihe Zhou[1] Minghong Zhang[2] YuQin Shi[1] Detao Zeng[1] Dongmei Liang[1]

[1] Chengdu Sport University, Chengdu, Sichuan, China
[2] Southwest Petroleum University, Chengdu, Sichuan, China

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INTRODUCTION: We measured the frequency and amplitude of a bow's vibration. By changing the resonance characteristic we hope to optimize the bow for training and competition.

METHOD: Two series absorbers are set on the recurve bow in 6 different arrangements (the single absorber is set on upper bow-grip or on lower bow-grip; the combination absorber is set on upper bow-grip or lower bow-grip; the single absorber is set on upper bow-grip and the combination absorber on lower bow-grip or set reversely.) in order to analyze the amplitude value spectrum of the strain and acceleration on shooting (Jihe Z., Minghong Z.,Yuqing S., & Shanfeng G.2002). The amplitude value spectrum is a relative energy unit of vibration effect of engineering.

Figure of experimentation

RESULTS AND DISCUSSION: The data of strain measurement system indicates that the amplitude value spectrum is 0.15EU (a relative Energy Unit of engineering) when the single absorber is set on upper bow-grip, and it is 0.36EU when on lower bow-grip. The amplitude value spectrums are 0.22EU and 0.53EU, respectively, while the combination absorber is set on upper bow-grip or lower bow-grip. The amplitude value spectrum is 0.15EU when the single absorber is set on upper bow-grip and the combination absorber on lower bow-grip, and it is 0.46EU when set reversely. The measure results show that the vibration effect is better when the single absorber is set on upper bow-grip, or the single absorber on upper bow-grip and the combination absorber on lower bow-grip. The data of acceleration measurement system shows that the amplitude value spectrum is 0.14EU when the single absorber is set on upper bow-grip and 0.15EU on lower bow-grip. The amplitude value spectra are 0.08EU and 0.29EU, respectively, when the combination absorber is set on upper bow-grip or lower bow-grip. The amplitude value spectrum is 0.20EU when the single absorber is set on upper bow-grip and the combination absorber on lower bow-grip, and 0.05EU when set reversely. The result indicates that it is best for vibration stop to set the combination absorber on upper bow-grip and the single absorber on lower bow-grip.

CONCLUSION AND SUGGESTION: 1. The measurement methods are feasible and effective. 2. The vibration effect is better when the single absorber is set on upper bow-grip, or the single absorber on upper bow-grip and the combination absorber on lower bow-grip. 3. It is best for vibration stop when the combination absorber is set on upper bow-grip and the single absorber on lower bow-grip. The measurement results of 6 setting methods shall be waiting for further check in the future. Our suggestions for the future experiment study are as following: sticking strain gauge on the lower bow slice; setting acceleration transducer on lower bow-grip; using more vibration equipment to measure.

REFERENCES:

Jihe Z., Minghong Z.,Yuqing S., & Shanfeng G.(2002) Dynamics analysis on reflexed bow. Proceedings of X national symposium on Biomechanics in sports.