

System for Measuring Rope Tension and Resonance Frequency of Mast Tools

Technology allowing the same setting of mechanical parameters of the bar and parallel bars across different sports grounds.

Given the different weights of the exercisers and their different abilities to actively work with the flexibility of the bar, each prefers an individual setup that allows them to optimally perform very complex spatiotemporal movement skills.



Seeking

Development partner
Commercial partner
Licensing

IP Status

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CHALLENGE

Currently, sports gymnasts in trapeze exercises, as well as gymnasts in parallel bars exercises, adjust the stiffness of the bar in different ways rather intuitively. In addition to adjustments based on the practitioner's feel, the measurement of the tension of the cables that tighten the structure has become more widespread, using a strain gauge. The latter is primarily intended for sailing and can be used to measure the tension of the anchor lines, but for the trainee, the trapeze structure or mast must have the necessary stiffness. So, it does not solve the needs of gymnasts. Moreover, even with the same construction of the same manufacturer's equipment, the same setting of the tension of the cables does not always have the same effect on the stiffness of the trapeze bar. Therefore, it is almost impossible to set the parameters of the apparatus in different gyms and competitions in the same way, i.e. the way the trainee is used to or needs.

TECH OVERVIEW

The invention is a device capable of determining, in a short period, the mechanical characteristics of a trapeze bar in conjunction with the tension of the cables, which will allow for accurate and reproducible adjustment of any trapeze structure, including bar tools of various manufacturers used in racing. The system displays digitally the current tension value of the anchor cables of the trapeze/rail structure (using a strain gauge) and displays digitally the current resonance frequency of the trapeze bar (using an accelerometer). By combining these measurements, a stable stiffness setting of the given sports equipment structure can be achieved independently of the sports field. It is these two variables that fundamentally influence the behaviour of the trapeze and thus the performance of the athletes. The results of both strain gauge and frequency measurements are evaluated and digitally displayed very quickly (within 10 s from the oscillation of the bar). The system thus allows a quick evaluation of the setup of the sports equipment and, if necessary, its quick adjustment as required.

BENEFITS

The design of the measuring module allows for easy mounting and dismounting of the module from the rope and for non-invasive measurements that do not change the setting and tension of the rope itself. This module weighs no more than 50 grams, ensuring that the added mass of the module does not affect the frequency of the mast. The system is user-friendly and is quick and easy for the user to work with.

APPLICATIONS

– Athletes, sports gymnasts, sports clubs

COMMERCIAL OPPORTUNITY

Masaryk University is seeking expressions of interest from industrial partners to take forward the commercial development of this technology.