2D miniplatform for measuring force at a computer key button

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Abstract

By the usage of computers, both at work and home, health problems due to typing started appear, mostly by the individual's posture, upper limbs repetitive movements, forces, etc. Several studies for understanding the causes for these health problems have been carried out since the early 90's. The main objective of this work is the development of a force platform to measure the finger's applied force at the keyboard during computer typing. This platform will be used in Biomechanics and Motor Control applications. It was designed and built in order to measure vertical force Fz (z direction), horizontal force Fx (x direction) and transversal force Fy (y direction) and the moment applied in the horizontal (and longitudinal) axis Mx (x direction). Resistance strain gauges were used as sensors bonded in cantilever beams. These sensors are connected to a Wheatstone full bridge, in order to measure, independently Fx, Fy and Mx. To developing the conception adopted, the force platform was evaluated and tested by a numerical model (finite elements technique). The data acquisition system is composed by (a) a computer, to acquire and further processing the collected information by (b) an A/D converter, (c) a signal conditioner and (d) the software SAD 2.0. The static calibration of the force platform presented linearity within the range of 3%. Dynamic tests showed that the platform has a fundamental frequency higher than 2300 Hz, and consequently permits its use for analysis of the applied forces during typing.

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