

Construction of a nichrome based hot-wire anemometer

Kankanamge B.L. and Jayatilleke K.P.S.*

Department of Physics, Faculty of Science, University of Ruhuna, Sri Lanka

The Hot Wire Anemometer is a device to measure velocity of a fluid. A small electrically heated wire is exposed to flowing fluid medium. Heat of the wire is transferred to the fluid and the change of resistance of the wire can be used as a measure of the velocity of the fluid. Platinum and Tungsten are the mostly used material for the hot-wire, but the cost of the instrument can be very high.

In this research project, a constant current hot-wire anemometer was constructed using low-cost nichrome wire of 1 cm long in the probe. A wind generator and Kestrel 4500 anemometer were used to calibrate the device. Voltage readings were recorded using PASCO Capstone software. Collected data of wind speed versus corresponding voltage across hot-wire was fitted to a formula for estimating the parameters of the formula. Wind speed is obtained from the fitted parameter values.

The constructed anemometer is capable of recording voltages and time and measuring wind speeds in the range $1 - 9 \text{ ms}^{-1}$. The range can be extendable. The device was tested with the normal wind variations in the outside environment. Data were collected for about 30 minutes in the outside environment and wind speed obtained from the calibration curve was plotted with the time. The wind speed was measured using the Kestrel 4500 anemometer in the same day during the same time interval. The results obtained from the laboratory and field experiments showed that the constructed anemometer is operating well.

Keywords: hot-wire anemometer, wind speed and nichrome

*Corresponding author: sunil@phy.ruh.ac.lk