Low Cost Test Rig for Demonstrating Single Plane Balancing Using Vibrations

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Vibration suppression is a main problem in rotating machinery. In-situ unbalance, as done in case of high-speed machinery, is measured using vibrations that are generated. Thus, a test rig is required for training personnel relating to this area is required. The existing balancing test rigs are costly. Availability of low-cost sensors and development boards like Arduino Uno help in fabricating the test rigs at low cost. In this work, a low-cost test rig demonstrating the vibration measurement and unbalance estimation is discussed. This project is aimed at fabricating motorized setup for demonstrating balancing of rotating masses. As a part of this work, 4 rotary masses are balanced. These four masses are mounted on a disc such that the radial position of the weights can be varied. Vibrations are measured when the disc is rotating. For measuring vibrations, pre-calibrated ADXL335 accelerometer which is available off-the-shelf, is used. This is interfaced to PC using Arduino. The measured unbalance is found to be in good agreement with that of theoretically calculated value. This test rig helps in bringing an insight to students as to how unbalance can be estimated and corrected as well as use of various commercially available vibration measurement sensors.

***Keywords*:** Rotary Mass Balancing, Accelerometer, Arduino, Vibration