

## DYNAMIC BALANCING OF PELTON WHEEL TURBINE RUNNER TO MINIMISE VIBRATIONS USING STATISTICAL QUALITY CONTROL AND PELWHELPRO1 SOFTWARE

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### ABSTRACT

This study investigated the effect of Pelton bucket masses designed for Pico hydro system on balancing and speed of computation of result to facilitate decision making process. Statistical quality control method was used in the analysis of the Pelton bucket masses and PELWHELPRO1 was used in decision making. A Pelton turbine runner was developed for a Pico hydro system, with 60 cast buckets, 24 buckets were selected because their masses were in the control limit region while 16 buckets were required by system as designed with masses ranging from 95.10 and 117.80 g. The mean of the mean masses for 16 buckets was 96.56 g and the mean of range is 2.30 g. PELWHELPRO1 revealed that buckets with masses close to the mean of the mean is a condition for selection; as they give positive balancing angle and reasonable masses. Bucket with large discrepancies reveals a negative balancing angle and large balancing masses are required. Hence Pelton bucket masses have significant effect on dynamic balancing and vibration.

**Keywords:** Balancing, Vibration, Pico, hydro, Pelton turbine runner, PELWHELPRO1, Graphical User Interface (GUI).