

## Experimental Investigation of Cup Anemometer under Static and Dynamic Wind Direction Changes: Evaluation of Directional Sensitivity

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**Abstract :** The 3-cup anemometer is the most commonly used instrument for wind speed measurement and, consequently, for the wind resource assessment. Though the cup anemometer shows accurate measurement under quasi-static conditions, there is uncertainty in the measurement when subjected to field measurement. Sensitivity to the angle of attacks with respect to horizontal plane, dynamic response, and non-linear behavior in calibration due to friction. The presented work aimed to identify the sensitivity of anemometer to non-horizontal flow. The cup anemometer was investigated under low wind speed wind tunnel, first under the static flow direction changes and second under the dynamic direction changes, at a different angle of attacks, under the similar conditions of reference wind tunnel speeds. The cup anemometer response under both conditions was evaluated and compared. The results showed the anemometer under dynamic wind direction changes is highly sensitive compared to static conditions.

**Keywords :** wind energy, cup anemometer, directional sensitivity, dynamic behavior, wind tunnel

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