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*The Effect of Windmill Blade Depth on Sound Pressure*

The purpose of this research was to test sound pressure by three windmill designs. A problem with wind energy is the noise produced; if the windmill is used to prevent the formation of ice in stock tanks, different frequencies emitted may hinder some animals from drinking. A pinwheel design was constructed using a 30 cm<sup>2</sup> piece of tin. The bolt at the center was adjusted flush with the back of the blade (closed; 0 inches). Another blade was tightened 1.5 inches from the back (open), and another at 3 inches. The blades were placed on a tripod; a fan set 2.5 feet in front, at the same height, and ran for 30 seconds before collecting the data. The microphone was held 2.5 inches from the windmill. Arbitrary sound pressure was collected as an indicator of sound frequency. The researcher believed the 3 inch open construction would emit the lower sound pressure. Similar to a Pelton wheel, the curve of the blades cause the wind to make a U-turn upon impact, increasing the impulse on the blade, yet the wind leaving the blade with less speed, thus producing less sound pressure. The research refuted the hypothesis as the mean averages were very similar (Closed 0": 2.604, Open 1.5": 2.5868, Open 3.0": 2.6244) indicating no significant difference between the depth of the three windmill blades. The average minimum for the Open 3" structure was the lowest, but it also had the highest average maximum, indicating the most varied sound pressure produced.