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Overview of Lambton College Vortex Engine Prototype Findings

The 8 m diameter by 6 m high vortex engine prototype at Lambton College in Sarnia Ontario shown in Figure 1 produced vortices up to 0.5 m in diameter inside the prototype and external vortices up to 0.25 m in diameter extending up to 40 m beyond the top of the cylinder. The air was heated by 30 ℃ with propane burners in a 1.5 m high lower chamber, entered the periphery of a 1.2 m high upper chamber tangentially and entered a 1.8 m diameter by 3 m high transparent cylinder via a central 1.5 m diameter roof opening. Figure 2 shows a vortex; smoke drawn in by the draft produced by the vortex rendered it visible. For this case the heat input and the air flow were 100 kW and 2.8 kg/s respectively.

Tall vortices could only be produced with wind of less than 1 m/s. Heat input and the air flow were adjustable. The maximum available heat input was 270 kW. Turbulence, which tended to fill the cylinder with smoke, developed if either the heat input or the air flow was too high which occurred at internal vortex diameter of over 0.5 m.

The prototype demonstrated that vortices can be produced from low temperature heat. The temperature of the air rising in the vortex was under 60 ℃. The initial goal of producing vortices up to 0.6 m in diameter and extending up to 60 m in height was not achieved probably because vortex diameter was limited by roof opening. This limitation might be overcome by flaring the cylinder at the bottom and eliminating the roof.

The prototype had: 10 temperature probes, 3 air velocity sensors, 2 anemometers, many tell tale flow indicators, 2 humidity sensors, 1 fuel flow transmitters, 1 pressure transmitter and a weather station. Data was collected continuously. Tangential velocities of 12 m/s were measured near the base of the vortex. Vertical velocities in the vortex were estimated at 5 m/s.

Ideal power and draft for a vortex of the Lambton size are 1 W and 1 Pa. The vortex was too small to drive a turbine but was capable of driving the propeller of an anemometer. The draft was too small to be measured with the available instrument. The fact that smoke was drawn in the center of the vortex showed that pressure reduction was produced. The velocity the smoke injection tube was estimated at 1 m/s which would require a draft of 0.4 Pa.

The Lambton prototype has clearly demonstrated that vortices can be produced from low temperature heat, has been a valuable learning environment and has provided basis for the design of larger AVE's. Ideal power increases exponentially with size. A large AVE could produce 50 millions times the power of the Lambton prototype. A large vortex would have high inertia vortex and should be able to withstand higher horizontal wind.

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Fig. 1 Lambton College Vortex Engine Prototype

Fig. 2 Vortex made visible with smoke emitter