

**Hydro-Cycle**  
**Hennepin Technical College**  
**Chase Korth**

Over the last five months my team, consisting of Adam Alrai, Anne Payette, and myself, Chase Korth, have built a motorcycle with a hydrostatic transmission. We started with a 1984 Honda Shadow VT700c as the base to our project. Our goal was to keep as much of the original motorcycle as possible while highlighting the advantages of a hydraulic drive system. Due to the high RPM range of the original Honda engine we used a much more tame Briggs and Stratton Vanguard 750cc, liquid cooled, v-twin. The Vanguard was limited, and designed to run at 3600rpm. We used an Eaton 70160 variable displacement piston pump that was designed to be run at a maximum of 3600rpm.

The main issues that our group encountered during the project all revolved around one theme: complete lack of space. The original engine had the transmission housing cast into the crankcase, making the entire package much more compact than our hydraulic set-up that used mostly off the shelf, bolt together parts.

One of the goals of the project was to keep as many of the original motorcycle controls as possible. We kept the hand throttle as well as the front brake lever, we removed the clutch lever, and modified the foot shifter to be more similar to vintage Harley heel-toe lever. The stroke adjustment on the pump is the one place that I still see large opportunity of improvement on the project.

All in all I believe that the project was a success in keeping the original controls, styling, and similar performance. We only increased the weight of the bike by a mere 25 pounds, and built it for a grand total of \$3261.21 (less pump and motor). After completing this project, it is my opinion that without hydraulic pumps and motors specifically designed for on-highway use these types of vehicles will remain proof of concepts.