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ABSTRACT

APPLICATION OF FLUID POWER TO DRIVE VEHICLES

In a world where the pursuit of sustainability and environmental consciousness has taken center stage, the search for cleaner and more efficient means of transportation has never been more critical. This project will connect the principles of fluid power, its historical context, its applications for driving vehicles, the potential for environmental sustainability, the integration with renewable energy sources, and practical applications in everyday transportation. Through this holistic examination, we aim to shed light on how fluid power can steer us toward a cleaner, more sustainable future on the roads ahead with the design of a bicycle that is fully powered by hydraulic fluid. To comprehend the complexity of fluid power-driven vehicles, we first familiarize ourselves with the key components that make up hydraulic systems. Which include pumps, cylinders, valves, and actuators, these components form the building blocks of a technology poised to redefine the future of transportation. Pumps are responsible for pressurizing the fluid within the system, creating the necessary force for movement. Cylinders are devices that convert fluid pressure into linear motion. They are often used to move loads or perform mechanical work. Valves control the flow of fluid within the system, directing it to specific components or adjusting the pressure as needed. Actuators are devices that convert fluid energy into mechanical motion. They include cylinders and motors, and they perform various tasks within a system. In this project we will design a hydraulic system for vehicle propulsion where the components work together harmoniously. The hydraulic pump pressurizes hydraulic fluid, which is then directed through valves to hydraulic cylinders or motors. This pressurized fluid actuates these components, which in turn drive the vehicle's wheels or other mechanical systems. Control systems and feedback mechanisms ensure that the system operates safely and efficiently, with the pressure relief valve and accumulator providing safeguards and performance enhancements as needed. The hydraulic fluid circulates, and the cycle continues to provide the necessary power for vehicle movement. The entire assembly will then be mounted on a bicycle and tested for optimal performance.