



Abstract

This literature consists the conceptual development, design and analysis of a piezoelectric controlled hydraulic actuator to be used as a cam-less valve mechanism for internal combustion engines. which was developed to be used as a replacement device for existing camshaft driven internal combustion engines. The unit should be fitted to each and every valve in the engine and there will be no requirement of a camshaft, the units will be individually controlled by a separate ECU.

The objective of the project was to design and develop an electro hydraulic device that will be capable of handling the loads which are normally beard by the camshaft and to provide a maximum lift of 8 mm within 2.5ms. Generally, the unit must be capable of varying this 8mm lift to a lower value, and reduce the 2.5 ms time duration as required.

In order to control the poppet valve of the engine a high pressure hydraulic valve and a piezo stack is used in this system, which will be controlled by the ECU. Furthermore, this device has shown the potential to increase many output parameters of the engine.

The project was carried out in four stages, the review of existing technologies and the conceptual development as the first stage. Then the design stage of the mechanical components, the design of electronic control system and finally the computer aided simulation and analysis stage of the design.