When an engine exhaust valve is open, the pressure in the exhaust manifold is higher than atmospheric pressure. The exhaust manifold is configured in such a way that positive and negative [pulses](https://en.wikipedia.org/wiki/Pulse_jet_engine) are produced during the operation of the cycle by designing it as a diffuser.

The SAV has three openings: one is connected to the manifold vacuum, another is connected to the exhaust pipe and the third is open to the atmosphere. When a negative pulse is induced in the exhaust, air from the atmosphere enters the exhaust manifold through a one-way reed valve and serves to oxidize the carbon monoxide and hydrocarbons in the exhaust.

 The main objective of the project is to design air suction valve and perform modal analysis to determine the mode shapes and natural resonance frequencies, the cad model is designed in solid works and model analysis dine in solid works simulation.