This paper presents the investigation of elasto-optic material properties using Mach-Zehnder Interferometer (MZI). These material properties are investigated by way of the use of a non-contacted test scheme, by applying force on the photoelastic material in the MZI system. The interference signal that changes due to the applied force is detected by a detector, which it is changed optical signal to electronic signal and then displayed in voltage on the oscilloscope. Results of the applied force/stress are plotted against the interference signal intensity, the linear relationship is occurred with the one using Araldite, Results are used for some material properties study. The feasibility study of using such materials for force sensor application are also investigated and discussed.