MEMS Based Pressure Sensor Using COMSOL Multiphysics

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Abstract

The world is getting digitalized, demands for new and emerging technologies have reached its peak, and customer demands have taken a U-turn. To cope with such unique requirements many systems and system devices are into the market and one of such enhancing technology is MEMS. MEMS are systems of small size, light weight, enhanced performance and reliability finding widest of applications in sectors of Automotive and instrumentation. A typical MEMS Sensor is at least one order of magnitude smaller than the traditional sensors used to measure instantaneous flow quantities like Pressure and Velocity. In this we focus on the outlook of measurement of Pressures like fluctuating wall pressure and wall shear stress and provide general background Design Criteria. These micro pressure sensors can also resolve all relevant scales even in high Reynolds number turbulent flows and arrays of micro pressure sensors make it feasible. MEMS sensor measure the pressure in term of deflection of sensing plate. In this paper we have designed and simulated the micro pressure sensor using MEMS tool COMSOL Multiphysics. The analysis is carried out for different parameters and results are verified.

Figures used in the abstract

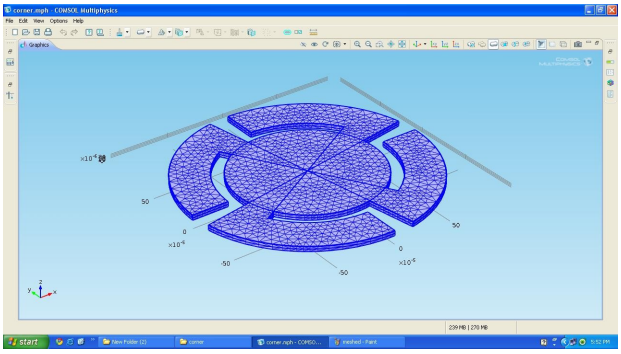

Figure 1: Meshed Model

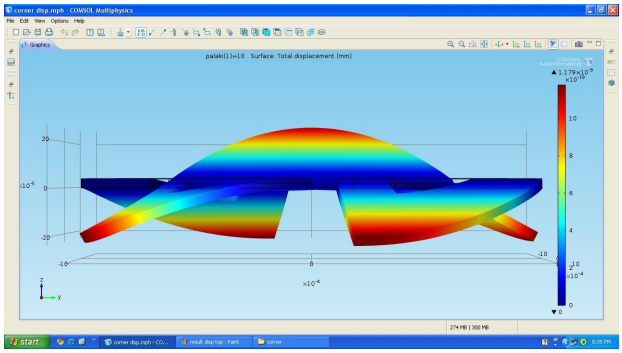

Figure 2: Final model- Front view

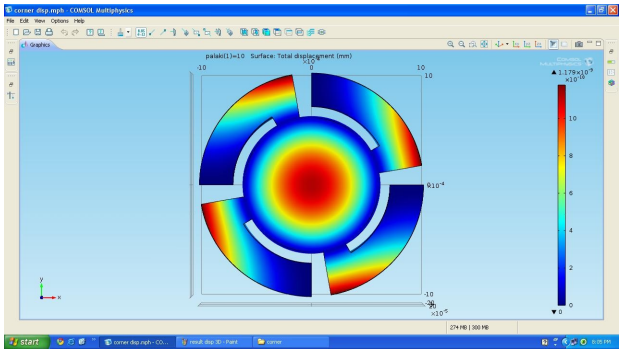

Figure 3: Final Model- Top view

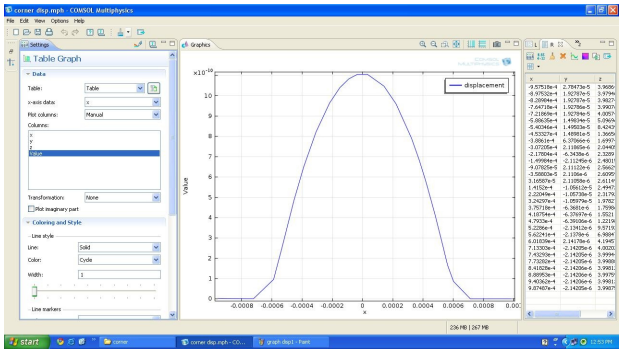

Figure 4: Final Graph