abstract
This thesis intends to cover the experimental investigation of the propagation of laser-generated optoacoustic waves in structural materials and how they can be utilized for damage detection. Firstly, a system for scanning a rectangular patch on the sample is designed. This is achieved with the help of xy stages which are connected to the laser head and allow it to move on a plane. Next, a parametric study was designed to determine the optimum testing parameters of the laser. The parameters so selected were then used in a series of tests which helped in discerning how the Ultrasound Waves behave when damage is induced in the sample (in the form of addition of masses). The first test was of increasing the masses in the sample. The second test was a scan of a rectangular area of the sample with and without damage to find the effect of the added masses. Finally, the data collected in such a manner is processed with the help of the Hilbert-Huang transform to determine the time of arrival. The major benefits from this study are the fact that this is a Non-Destructive imaging technique and thus can be used as a new method for detection of defects and is fairly cheap as well.