

Structural Health Monitoring of composite materials using PZT actuators and sensors

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Health monitoring of bridges, buildings, aircrafts, and spacecraft using a network of sensors has gained popularity over the years. In this work, PZT actuators and sensors are used for damage detection in a composite. The composite panels are fabricated in house using the VARTM process. The panels are cut into small coupons (12 inch x 1 inch) to test various properties of the composite. A PZT actuator is surface mounted on the composite coupon to generate Lamb waves and the response is measured by a surface mounted PZT sensor. Data is first taken on an undamaged composite coupon. Intentional damaged is introduced (in various forms) on the coupon and measurements are repeated. Damage is detected by comparing the response of the damaged and undamaged composite coupons. Finite element methods (FEM) are used to model the simulated damage coupon and verify the experimental setup.