

Design and Development of Active Morphing Wing based on Shape Memory Alloy Actuators – Funded by SERB (CRG/2020/003585)



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Objectives:

- To develop a Finite Element Model for aero-thermo-elastic analysis of a Shape Memory Alloy actuated aerofoil for wing morphing application.
- Based on the FE model, optimal design will be obtained following standard optimization procedures.
- Aerodynamic characteristics of the SMA actuated aerofoil will be evaluated in the subsonic wind tunnel facility at IIT Guwahati, and necessary modifications will be incorporated in the final design.

Progress:

- A FE code has been developed to model the thermo-elastic analysis of Shape Memory Alloy actuated two-dimensional elastic host structure under practical thermo-mechanical loading conditions (refer Fig. 1).
- A prototype of an aerofoil, having movable trailing edge has been designed and 3D printed (refer Fig. 2) and its aerodynamic characteristic is tested in the wind tunnel facility at IITG.

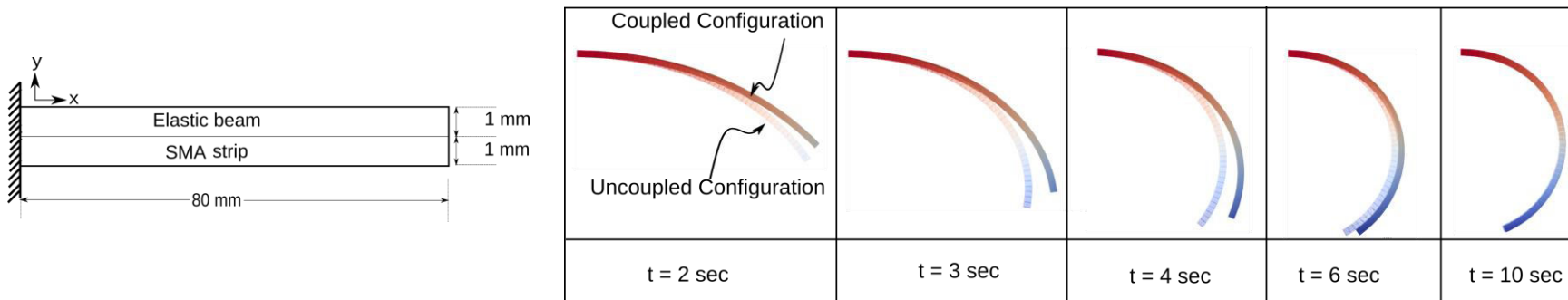


Fig. 1 Simulated response of the SMA actuated elastic host beam undergoing large deformation



Fig. 2 Prototype of the morphing aerofoil