

## Analysis of Bending Abilities of Soft Pneumatic Actuator

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**Abstract :** Pneumatic gripper use compressed air to operate its actuators (fingers). Unlike the conventional metallic gripper, a soft pneumatic actuator (SPA) can be used for relocating fragile objects. An added advantage for this gripper is that the pressure exerted on the object can be varied by changing the dimensions of the air chambers and also by the number of chambers. SPAs have many benefits over conventional robots in the military, medical fields because of their compliance nature and are easily produced using the 3D printing process. In the paper, SPA is proposed to perform pick and place tasks. A design was developed for the actuators, which is convenient for gripping any fragile objects. Thermoplastic polyurethane (TPU) is used for 3D printing the actuators. The actuator model behaves differently as the parameters such as its chamber height, number of chambers change. A detailed FEM model of the actuator is drafted for different pressure inputs using ABAQUS CAE software, and a safe loading pressure range is found.

**Keywords :** soft robotics, pneumatic actuator, design and modelling, bending analysis

**Conference Title :** ICAMMMMET 2021 : International Conference on Applied Mechanics, Materials, Manufacturing, Mechanical Engineering and Technology

**Conference Location :** Amsterdam, Netherlands

**Conference Dates :** May 13-14, 2021