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# NUMERICAL SIMULATION OF QUASI-STATIC COMPRESSION ON A COMPLEX RUBBER FOAM

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**ABSTRACT** A complex rubber foam under quasi-static compression is simulated using the finite element method (FEM). The present work sets up the phenomenological constitutive model for the silicon rubber. The computerized tomography (CT) technique is utilized to reconstruct the real complex foam geometries. The quasi-static uniaxial compression on the foam is simulated in ABAQUS. The present work obtains the stress response as the nominal strain nearly reaches 80% and the foam exhibits hyper-elastic behavior. The FEM results achieve good agreements with the data obtained from the multi-scale simulation and the tests as the nominal strain is less than 60%.

**KEY WORDS** complex, rubber, foam, quasi-static, compression, FEM

## I. INTRODUCTION

Rubber foam materials have been widely used in modern industry because of their excellent mechanical properties and biological stabilities, such as insulating properties, shock resistance, wear resistance, and physiological inertness[1-3]. Therefore, the design and simulation of their mechanical properties become increasingly important for their engineering applications, considering that the mechanical behaviors of foams highly depend on their microstructures.

Within the elastic regime, a lot of researchers have numerically

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