

DYNAMIC MECHANICAL ANALYSIS OF ELASTOMERS

B.T.A. Bhashana, K.M.W.K. Weerasena, and V.S.C. Weragoda*

Department of Materials Science and Engineering, University of Moratuwa, Sri Lanka

**Email: sampathw@uom.lk*

Dynamic Mechanical Analysis (DMA) indeed plays a significant role in both research and quality control processes, especially in the field of materials science and engineering. DMA allows researchers and manufacturers to study the viscoelastic properties of materials, such as polymers, composites, rubbers, and biomaterials, under various conditions like temperature, frequency, and strain. However, the high cost of traditional DMA equipment can be a limiting factor for its widespread adoption, particularly for researchers and manufacturers with budget constraints.

To address this limitation, we initially introduced low-cost DMA equipment capable of handling larger sample sizes, specifically designed for conducting frequency sweep and compression mode tests, to enhance the quality control process in the tire industry in Sri Lanka. In a frequency sweep test conducted in a strain-controlled dynamic mechanical analysis (DMA) setup, several parameters can be measured to characterize the viscoelastic behavior of the material: Loss tangent, relaxation time, storage modulus (E'), loss modulus (E''), molecular weight distribution, damping properties (damping coefficient).

Keywords: Dynamic Mechanical analysis, Low Cost, Frequency Sweep, Compression Mode.