# Mathematical Modeling of Rubber Friction and Wear Behavior in Engineering Applications

**M. W. T. Chamod , P. K. Miranga, and V. S. C. Weragoda***

*Department of Materials Science and Engineering, University of Moratuwa*

**Email:* sampathw@uom.lk

This study examines how rubber hardness and tensile strength influence friction and wear behavior in engineering applications. Using a robust mathematical modeling approach, the research explores the complex mechanisms governing rubber friction and wear across various surfaces. The study integrates theoretical formulations with experimental data to create a predictive model that accurately describes the tribological properties of rubber under different operational conditions. This research has wide-ranging implications, from improving road safety through better tire design to optimizing mechanical systems with rubber-based components, such as bearings and seals. The insights from this study can guide the development of more resilient and efficient rubber materials for engineering applications.

**Keywords:** *rubber friction, mathematical model, Amontons-Coulomb law*