

AIMS Materials Science, 12(6): 1246-1264.

DOI: 10.3934/matersci.2025058 Received: 13 September 2025 Revised: 24 October 2025 Accepted: 06 November 2025

Published: 09 December 2025

https://www.aimspress.com/journal/Materials

Research article

Design and finite element analysis of a composite modular airless tyre

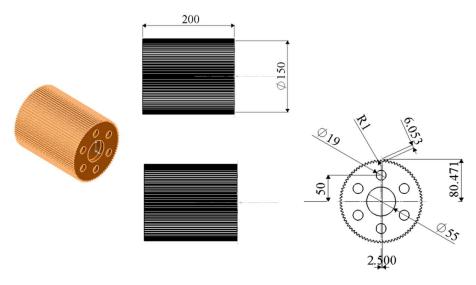
Sivarao Subramonian^{1,*}, Kumaran Kadirgama², Zuhair Khalim¹, Shukor Salleh¹, Umesh Vates³, Satish Pujari⁴, Sara Lee Kit Yee⁵, Devarajan Ramasamy² and Anuar Kassim⁶

- ¹ Centre of Smart System and Innovative Design, Faculty of Industrial and Manufacturing Engineering and Technology, Universiti Teknikal Malaysia Melaka, 76100 Durian Tunggal, Melaka, Malaysia
- ² Faculty of Mechanical & Automotive Engineering Technology, University Malaysia Pahang Al-Sultan Abdullah, 26600 Pekan, Pahang, Malaysia
- ³ Mechanical Engineering Department, Amity University, 201301, Uttar Pradesh, Noida, India
- ⁴ Lendi Institute of Engineering and Technology, Vizianagaram, 535005, Andhra Pradesh, India
- ⁵ Centre for Energy, Vibration and Acoustics Research (CEVA) Faculty of Engineering and Technology Tunku Abdul Rahman University of Management and Technology, 53300 Kuala Lumpur, Malaysia
- ⁶ Center of Robotics and Industrial Automation, Faculty of Technology and Electrical Engineering, Universiti Teknikal Malaysia Melaka, 76100 Durian Tunggal, Melaka, Malaysia
- * Correspondence: Email: sivarao@utem.edu.my; Tel: +60-166-341-481.

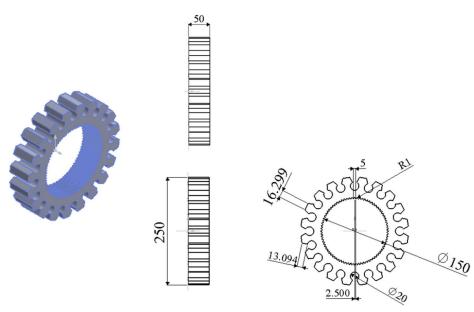
Supplementary

Geometric parameters:

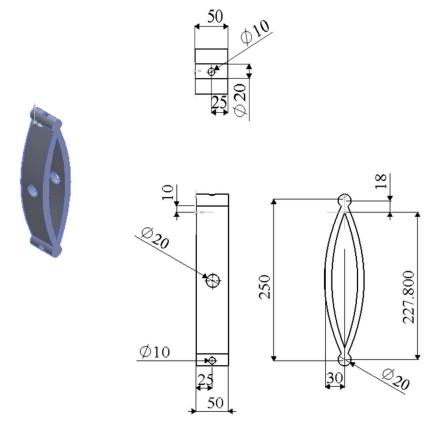
1. Axel connection



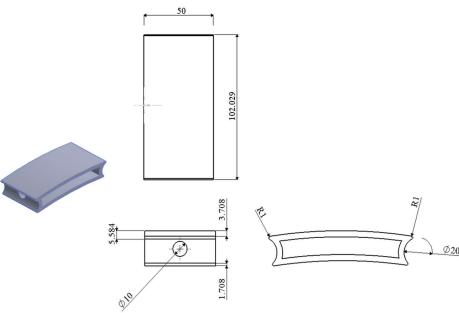
2. Leaf spring hubs



3. Leaf springs



4. Tyre tread





© 2025 the Author(s), licensee AIMS Press. This is an open access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0)