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**Optimization of tribo-performance of brake friction materials: Effect of nano filler****Tej Singh<sup>1\*</sup>, Amar Patnaik<sup>2</sup>, Brijesh Gangil<sup>3</sup>, Ranchan Chauhan<sup>4</sup>**<sup>1</sup>Department of Mechanical Engineering, Manav Bharti University, Solan, India-173229<sup>2</sup>Department of Mechanical Engineering, M.N.I.T. Jaipur, India-302017<sup>3</sup>Department of Mechanical Engineering, H.N.B U. Garhwal, India-246194<sup>4</sup>Department of Mechanical Engineering, Shoolini University, Solan, India-173229

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**Abstract:** This research work examined brake friction materials containing nanoclay and multi-wall carbon nanotube (MWCNT) to determine their effect on the tribo-performance. The tribo-performance of brake friction materials were investigated using a Kraus friction testing machine conforming to the Regulation-90 as per the ECE (Economic Commission for Europe) norms. The result of experiment indicated that MWCNT enhances the friction and fade performance, but depresses the wear performance, whereas nanoclay improves the wear and recovery performance but simultaneously depresses the friction performance as well. Variability coefficient improves with nanoclay contents whereas, friction fluctuations ( $\mu_{\max}$ - $\mu_{\min}$ ) improve with MWCNT content. Preference selection index (PSI) method was applied to rank the friction materials by using several performance defining criterions (PDC) including coefficient of friction ( $\mu$ ), wear, friction recovery-%, friction fade-%, stability coefficient, variability coefficient, friction fluctuation and disc temperature rise respectively. These results show that the best combination of tribological properties was exhibited by nanoclay filled formulation.

**Keyword:** Friction material; MWCNT; Nanoclay; Optimization; PSI

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