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Prediction and Optimization on Tribological Behaviour of Kenaf/Carbon Fiber Reinforced Epoxy Matrix Hybrid Composites

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Abstract

The awareness on sustainability of the environment among the researchers leads to the exploration of natural fiber composite materials. Hybridization of synthetic fiber and natural fiber is one of the potential strategies to enhance the mechanical properties as well as the degradability of such composite materials. However, less information concerning the optimization of tribological properties of this hybrid composite is available in literature. The aim of this study is to propose a statistical model to predict and optimize wear and coefficient of friction of kenaf / carbon reinforced epoxy composite . The value of parameters; load and sliding velocity ranges from 10 to 30 N and 20.9 to 52.3 m/s, respectively, are used to assess wear and coefficient of friction (COF) of different stacking sequences using the Analysis of Variance (ANOVA). The tribological test was conducted using a pin-on-disc tribometer. Multifactorial design analysis was employed to optimize the test control variables. It was found that, the optimized factors that affects the coefficient of friction and wear is at load 30 N and sliding velocity of 52.36 m/s. The proposed statistical models for wear and COF have 99.5% and 97.6% reliability, respectively. The generated equation models are bounded within the wear test control factors and ranges. The outcome from this study will be very useful for main parameter prediction for an optimized wear and COF.

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10.4028/p-j27v8q; ANOVA; Coefficient of friction; DOE; Factorial design; Hybrid composite ; Sliding wear

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References (15)

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1 Thakur, V.K., Thakur, M.K., Gupta, R.K.

Review: Raw Natural Fiber-Based Polymer Composites

(2014) *International Journal of Polymer Analysis and Characterization*, 19 (3), pp. 256-271. Cited 525 times.
doi: 10.1080/1023666X.2014.880016

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2 Ku, H., Wang, H., Pattarachaiyakoop, N., Trada, M.

A review on the tensile properties of natural fiber reinforced polymer composites (Open Access)

(2011) *Composites Part B: Engineering*, 42 (4), pp. 856-873. Cited 1388 times.
doi: 10.1016/j.compositesb.2011.01.010

View at Publisher

3 Barari, B., Ellingham, T.K., Ghamhia, I.I., Pillai, K.M., El-Hajjar, R., Turng, L.-S., Sabo, R.

Mechanical characterization of scalable cellulose nano-fiber based composites made using liquid composite molding process

(2016) *Composites Part B: Engineering*, 84, pp. 277-284. Cited 68 times.
doi: 10.1016/j.compositesb.2015.08.040

View at Publisher

4 Rajak, D.K., Pagar, D.D., Menezes, P.L., Linul, E.

Fiber-reinforced polymer composites: Manufacturing, properties, and applications (Open Access)

(2019) *Polymers*, 11 (10), art. no. 1667. Cited 332 times.
https://res.mdpi.com/d_attachment/polymers/polymers-11-01667/article_deploy/polymers-11-01667.pdf
doi: 10.3390/polym11101667

View at Publisher

5 Faruk, O., Bledzki, A.K., Fink, H.-P., Sain, M.

Biocomposites reinforced with natural fibers: 2000-2010

(2012) *Progress in Polymer Science*, 37 (11), pp. 1552-1596. Cited 2531 times.
doi: 10.1016/j.progpolymsci.2012.04.003

View at Publisher

6 Erdemir, A.

Solid lubricants and self-lubricating films

(2000) *Modern Tribology Handbook: Volume One: Principles of Tribology*, pp. 787-825. Cited 84 times.
https://www.taylorfrancis.com/books/e/9780849377877
ISBN: 978-084937787-7; 978-084938403-5

7 Gujjala, R., Ojha, S., Acharya, S.K., Pal, S.K.

Mechanical properties of woven jute-glass hybrid-reinforced epoxy composite

(2014) *Journal of Composite Materials*, 48 (28), pp. 3445-3455. Cited 100 times.
http://jcm.sagepub.com/content/by/year
doi: 10.1177/0021998313501924

View at Publisher

8 Mukherjee, T., Kao, N.

PLA Based Biopolymer Reinforced with Natural Fibre: A Review

(2011) *Journal of Polymers and the Environment*, 19 (3), pp. 714-725. Cited 231 times.
doi: 10.1007/s10924-011-0320-6

View at Publisher

9 Omrani, E., Menezes, P.L., Rohatgi, P.K.

State of the art on tribological behavior of polymer matrix composites reinforced with natural fibers in the green materials world (Open Access)

(2016) *Engineering Science and Technology, an International Journal*, 19 (2), pp. 717-736. Cited 190 times.
www.journals.elsevier.com/engineering-science-and-technology-an-international-journal/
doi: 10.1016/j.jestch.2015.10.007

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10 Akil, H.M., Omar, M.F., Mazuki, A.A.M., Safiee, S., Ishak, Z.A.M., Abu Bakar, A.

Kenaf fiber reinforced composites: A review

(2011) *Materials and Design*, 32 (8-9), pp. 4107-4121. Cited 822 times.
doi: 10.1016/j.matdes.2011.04.008

View at Publisher

11 Zhang, S.-W.

Green tribology: Fundamentals and future development
(Open Access)

(2013) *Friction*, 1 (2), pp. 186-194. Cited 69 times.
http://www.springer.com/engineering/mechanical+engineering/journal/40544
doi: 10.1007/s40544-013-0012-4

View at Publisher

12 Basavarajappa, S., Chandramohan, G., Paulo Davim, J.

Application of Taguchi techniques to study dry sliding wear behaviour of metal matrix composites

(2007) *Materials and Design*, 28 (4), pp. 1393-1398. Cited 229 times.
doi: 10.1016/j.matdes.2006.01.006

View at Publisher

13 Mustafa, A., Bin Abdollah, M.F., Amiruddin, H., Shuhimi, F.F., Muhammad, N.

Optimization of friction properties of kenaf polymer composite as an alternative friction material

(2017) *Industrial Lubrication and Tribology*, 69 (2), pp. 259-266. Cited 9 times.
http://www.emeraldinsight.com/info/journals/ilt/ilt.jsp
doi: 10.1108/ILT-05-2016-0118

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14 Chin, C.W., Yousif, B.F.

Tribological behaviour of KFRE composite

(2010) *International Journal of Modern Physics B*, 24 (28), pp. 5589-5599. Cited 8 times.
doi: 10.1142/S0217979210056232

View at Publisher

15 Chin, C. W., Yousif, B. F.
Adhesive and frictional behaviour of polymeric composites based on kenaf fibre
(2008) *ICAT 274, 2nd Int. Conf. Adv. Tribol*, pp. 1-3. Cited 3 times.
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