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Frictional characterization of teak wood dust-filled epoxy composites

Mishra, A.[a,*]

[a]Indira Gandhi Institute of Technology, Sarang, Odisha, India

A B S T R A C T

Composites of teak wood dust particles of 150 μm, 212 μm, and 300 μm sizes with 10 % weight fractions were developed by a hand moulding technique. A wooden mould was prepared for casting the composite pins of 8 mm diameters and 50 mm length. Sliding wear tests were conducted on a pin on disc friction and wear monitor. It was observed that the composite with mesh size 150 μm of teak wood dust exhibited the least wear rate. Furthermore, the lowest coefficient of friction was also seen in the composite with a 300 μm size wood dust filler. The composite with 212 μm size wood dust showed an increase in the coefficient of friction but at higher loads dropped down probably because of the formation of transfer film between the composite and the steel disc. The composites with 150 μm and 300 μm size dust particles were in close ranges of friction coefficients, i.e. 0.64 and 0.71, respectively. Thus though the coefficient of friction was high for a 150 μm size filler composite, the wear increased at a steady rate and may stabilize after running for more than a 5 km distance later. Out of the above three composites the wood dust of a 150 μm composite may thus be a better choice for frictional applications.

A R T I C L E I N F O

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**Corresponding author:*
igit.antaryami@gmail.com
(Mishra, A.)

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Izvirni znanstveni članek

Karakterizacija trenja epoksi kompozitov, polnjenih s prahom iz tikovega lesa

Mishra, A.[a,*]

[a]Indira Gandhi Institute of Technology, Sarang, Odisha, India

P O V Z E T E K

Najprej smo pripravili kompozitne cilindrične vzorce iz epoksija, polnjenim s prahom iz tikovega lesa. Prah je imel tri različne granulacije, in sicer 150 µm, 212 µm in 300 µm, utežni delež prahu pa je bil 10 %. Za izdelavo cilindričnih kompozitnih vzorcev premera 8 mm in dolžine 50 mm, smo uporabili lesene kalupe. Trenje in obrabo vzorcev smo ugotavljali z drsenjem vzorcev po vrtečem jeklenem disku (hitrost vrtenja diska je bila 400 rpm, drsna pot 5 km, obremenitev vzorcev pa smo izvedli v petih različnih nivojih). Ugotovili smo, da imajo najmanjšo obrabo vzorci z velikostjo prašnih delcev 150 µm. Najmanjši koeficient trenja smo ugotovili pri vzorcih, ki so bili polnjeni s prahom z velikostjo delcev 300 µm. Kompozitni vzorci z velikostjo delcev 212 µm kažejo sprva porast koeficienta trenja, vendar pa se pri večjih obremenitvah trenje zmanjša, najbrž zaradi oblikovanja tankega drsnega filma med vzorcem in vrtečim jeklenim diskom. Kompozita, z velikostjo prašnih delcev 150 µm oziroma 300 µm, sta imela približno enaka koeficienta trenja, in sicer 0.71 oziroma 0.64. Čeprav je bil koeficient trenja za kompozite z velikostjo delcev 150 µm pri višjih obremenitvah nekoliko višji, pa se je obraba enakomerno povečevala in kasneje stabilizirala, ko je bila dolžina drsne poti nad 5 km. Zaradi tega je med zgornjimi tremi kompoziti – za aplikacije, kjer je pomembno trenje –, vzorec z velikostjo prašnih delcev 150 µm dobra izbira.

P O D A T K I   O   Č L A N K U

Ključne besede:
Prah iz tikovega lesa
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**Kontaktna oseba:*
igit.antaryami@gmail.com
(Mishra, A.)

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