

## **Study on sliding wear characteristics of epoxy composites reinforced with short Areca-catechu fibers using Taguchi method**

**Purushottam Kumar Choudhary**

National Institute of Technology, Rourkela, India.  
*kumarpurushottam41@gmail.com*

**Priyabrat Pradhan, Alok Satapathy**

National Institute of Technology, Rourkela, India.

### **ABSTRACT**

This paper reports on the dry sliding wear behavior of a new class of natural fiber reinforced polymer composites. Such composites are fabricated using epoxy as the matrix and short areca-catechu fibers as the reinforcing element through the conventional hand lay-up route. Four different fiber loadings (0, 1, 2, 3 wt. %) are considered to get samples of different compositions. Physical characteristics like density and porosity are measured. Dry sliding wear tests are conducted using a pin-on-disc test rig as per ASTM standards. Different sliding speeds, sliding distances and normal loads are considered. Tests are designed as per Taguchi's  $L_{16}$  orthogonal array and specific wear rate for each test run is obtained. Significant control factors affecting the wear rate are identified and ranked. It is found that the presence of short Areca-catechu fibers helps in improving the wear resistance of epoxy in dry sliding mode. An optimal factor setting for minimum wear rate is determined. Based on the experimental data, a predictive equation is proposed to estimate the specific wear rate of such composite under varied test conditions. The results predicted by this proposed correlation are found to be a good agreement with the experimental ones.

*Keywords: Epoxy; Areca-catechu fiber; sliding wear test; Taguchi method*