

Rolling Contact Device Using Ball-On-Flat Testing Principle

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The purpose of this communication is to present a new rolling contact device CTD-ROL (Fig.1), which uses a ball-on-flat testing principle and to discuss complementary use and some potential advantages of this device compared to most of presently used rolling contact machines. The loading arm of the new device moves linearly in a reciprocating motion and rolls the ball over the flat specimen. Instead of discs, rods or similar circular-shaped specimens, flats can be used in this device. Furthermore, standard flexure test bars can be used as convenient and inexpensive specimens, which can have a significant benefit particularly with high-cost ceramic rolling-contact specimens. Due to the simple geometry, specimens could be small and easily prepared even with various surface-finishing conditions. Similar advantage can be obtained with hard-coated samples, which can be sometimes difficult to prepare as a rounded specimens. There are no revolving parts in the presented device, as is the case in most other presently used rolling contact machines, which reduces possible difficulties with dynamic effects during testing and avoids need for extremely fine tolerances of machine parts and specimens. For comparison and evaluation reasons, some results of non-lubricated rolling contact experiments on silicon nitride ceramics are also presented and compared with data from literature, performed on conventional rolling contact machines. The results show a good repeatability of results and same or very similar wear mechanisms as obtained in other studies under comparable conditions.

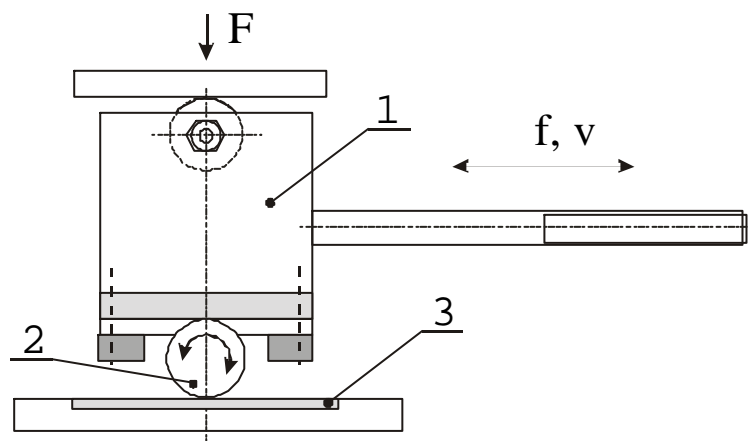


Fig. 1: A schematic of CTD-ROL device. 1-loading unit, 2-standard ball, 3-testing sample.
 v / f – reciprocating sliding velocity / frequency of oscillation of the driving unit.