Nick Bierwisch et al., J Material Sci Eng 2017, 6:1 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.059

Predictive wear modeling: The ultimate simulation tool for optimum tribo coatings

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Nowadays the used materials or material combinations in all application fields (e.g. optical, avionic, fun sports or automotive industry) are getting more and more complex. These complex structures are needed in order to increase the performance and lifetime of the components. Such improvements of each part of your complex device, tool or structural element are necessary to reach the performance goals demanded by the desired application. This increased complexity demands extended analysis and optimization methods. Engineering knowledge and rules of thumb aren't enough anymore. Proper characterization and optimization of such structures requires invertible mathematical tools of sufficient holistic character. SIO developed analytical models which dramatically speed up the simulation of complex contact situations compared to FEM systems. One big field in which these models could be used is the lifetime prediction for such complex devices. SIO created complex wear laws which can use more than one wear parameter and take the complete stress field into account. With such more complex laws, it's possible to reproduce the tribological measurements more accurately and so they could be used for a much more accurate lifetime prediction. Using such models can save a lot of testing time and money. Another extension of this concept is the introduction of quantum theoretical tools in order to better observe and control the total uncertainty of the model with respect to experiment, life time prediction and optimization.

Biography

Nick Bierwisch studied Computer Science from 1998-2003 in Leipzig. In 2006, he started working in the field of Contact Mechanics and he was a self-employee in 2008. Most of his work in the field of Contact Mechanics was done at Saxonian Institute of Surface Mechanics.

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