

Research theme	Physics in Design
Research title	Design rules for durable polymer sliding contacts
Researcher	Vikram Ramesh
Research period	From 1 st Dec 2015 to 30 th Aug 2016
Company	Philips
Supervisor	Dr. Ir. Wessel Wits

Background

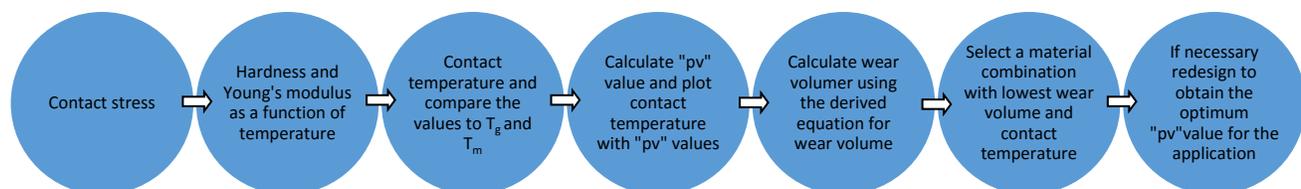
Polymer tribology is a niche field which is growing due to need of reduction in weight, cost and ease of manufacturing. Polymers are used in wide spectrum of industries from consumer products to high tech industries. For the development of sustainable and reliable products, lifetime prognosis is a major challenge. One of the phenomena that determines the lifetime of consumer electronic devices is volumetric wear. The wide variety of polymers available in the market and different parameters that effect the lifetime imposes a challenges on the prediction of the lifetime of components which are based on results obtained from model tests.

Assignment

The assignment involves experimental and simulations in developing a theoretical model for wear volume polymer-polymer contacts and stepwise procedure to develop a durable sliding contact.

Results

The frictional and wear values depend on the static and rotating element of the material combination. Ambient temperature has both positive and negative effect on the frictional and wear behavior of polymers. The “pv” value alone cannot be used in isolation to predict frictional and wear behavior of the polymer contacts. The wear model developed indicated the important parameters that influence the wear volume in the polymer-polymer contacts. The input parameters for this formula are easily available from the data sheets and the design parameters and the results are comparable to other formulas proposed by different researchers. Based on the results of the experiments and simulation the stepwise procedure is developed as shown below.



Personal experience

The assignment was carried out at Philips Innovation Services, it is part of Philips that helps in accelerating the development of products with their expertise and research. The best part of the research was the topic itself as it was new and I had to dig deep into the subject to understand the topic. Working in an international environment with experts in different fields and their guidance helped me do well during my thesis. Philips interns group organized different events which helped me meet different people from different countries and culture, also attended loads of events with fellow interns at different place all over Netherlands. I was lucky to get a very supporting supervisor who was not only there for my questions regarding the thesis but also helped me develop overall knowledge about the subject by taking me to different exhibitions and lectures.