Dynamic Friction Coefficient

Application Note

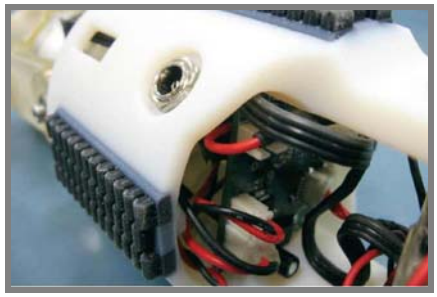
Overview

Friction is defined as the force that opposes the relative motion or tendency of such motion of two surfaces in contact. The friction coefficient of a prototype's surface is a functional component, not an aesthetic one, and simulates the end product's mechanical properties. A well-designed prototype that takes friction into consideration can have the following advantages: an improved grip for the end-user, reduced part wear, simulated movement functionality and sliding abilities.

Figure 1 The objects pictured above were printed in a single build session to simulate the dynamic friction coefficient.

Why Connex?

Connex printing systems provide a solution for prototyping surfaces with varied friction coefficients that were impossible or cost-prohibitive to prototype in the past. By being able to print several materials in one build process, Connex systems can produce prototypes with varying friction areas on one given part. Users determine the friction coefficients for different areas of a given part according to the load factor. Consequently, Connex systems save time and money by providing an easy solution for prototyping complex parts whose dynamic friction coefficients can be tested in a single build process.

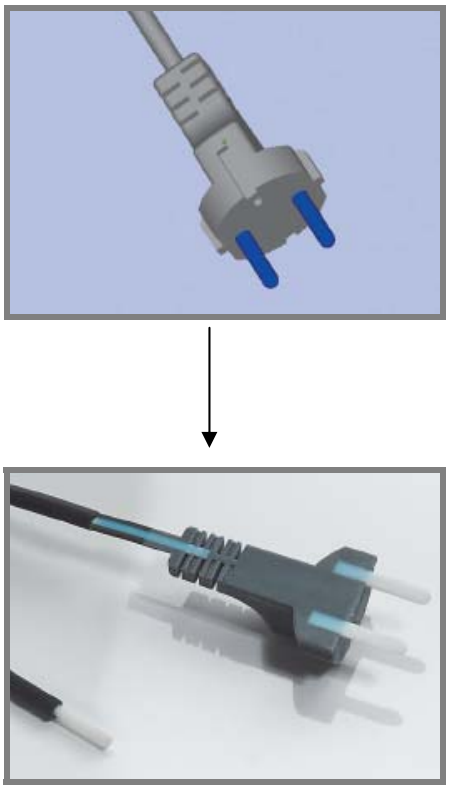


Figures 2, 3, 4
The pictures above were taken from the Technion Bio-Snake Case Study. They demonstrate how the dynamic friction coefficient is used to generate a force that opposes the relative motion or tendency of such motion of two surfaces in contact.

Tips and Tricks

- Save your design in separate STL files according to the different parts. This is recommended for flexible areas, as well as for rigid parts. Later the parts can be printed in different color tones to visually separate areas of the model.
- Label each part with its relevant shore value. Labeling will help you later easily determine which shore values received the highest score in your evaluation criteria tests.
- Design you model in such a manner to enable the mounting of flexible parts on your full assembly of rigid and flexible parts. You can then use the Connex systems' ability to print up to 9 different materials in one build process and then assemble each part on the model for evaluation.

- Coating: Use the Objet Studio™ software to coat parts with various thicknesses from 0.3-3mm with one mouse click. You may use any one of the different Digital Materials™ as the coating material.
- To avoid disengagements, design the model so the rigid material extrudes as a thin core into the flexible one (See figure below). This creates a connection that can withstand repeated flexing and bending.



Reference

- White Paper Over Molding: Can be found under White Papers on the Objet website
- Case study: Can be found on the Objet website under Case Studies → Over Molding
- Movie Bio robotic model: Can be found on the Objet website under Movies

Disclaimer

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