Shock Absorption

Application
Note

Overview

Shock/energy-absorbing components are often used as a safety measure to absorb runaway energy in case of a component or system failure. Practical examples of shock absorbing components include bumpers, isolators, fasteners, mounts, spacers and pads.

Bumpers

Isolators

Fasteners

Spacers

Typical shock absorption applications include:

- Absorbs vibration and shock loads

- Accepts a large load deformation with practically no friction

- Noise generation prevention

- Sealing (liquid or gas)

Why Connex?

With Connex printing systems it is possible to print parts that provide shock absorption. Designers plan varying areas of absorption in the CAD software and transform these into shells for STL file conversion. Digital Materials™ with shore levels matching the desired shock absorption criteria are used to produce the parts. The mechanical properties of the Digital Materials™ can simulate the end-product's material requirements, rendering function testing possible. Simulation of shock absorptions can take the form of:

- Protective Covering – Coating undertaken on the rigid part to provide

   protection

- Vibration Damping – Coating undertaken on a given part to provide

   damping of vibrations

Tips and Tricks

- Save the 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 that you evaluate with its relevant shore value. The label

   will help you easily determine later which shore value represents the

   suitable shock absorption score in your evaluation criteria tests.

- When printing a spherical surface that involves two materials from

   different families, rigid and flexible, it is recommended to print the part so
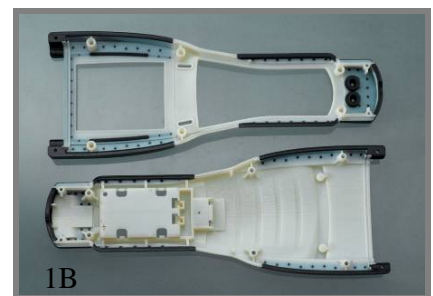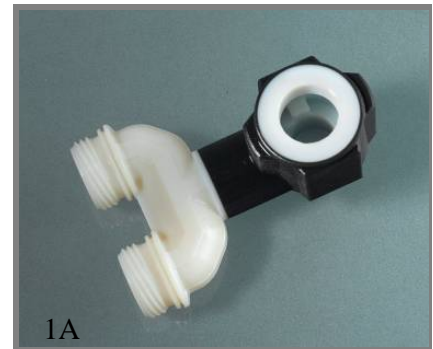
**Figures 1A – 1B:** Prototype printed by Connex
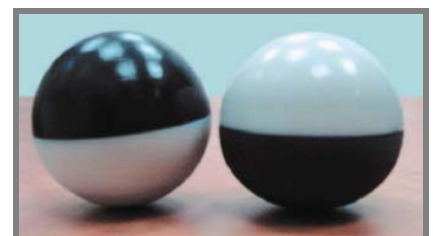
✓ Flexible material (TangoBlack) is positioned on top   ✗ Flexible material (TangoBlack) is positioned at bottom

Figure 2: VeroWhite and TangoBlack printing results

the rigid material will be underneath the flexible one (as shown in Figure 2). Otherwise, one may experience distortions in the lower part made of the flexible material.

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
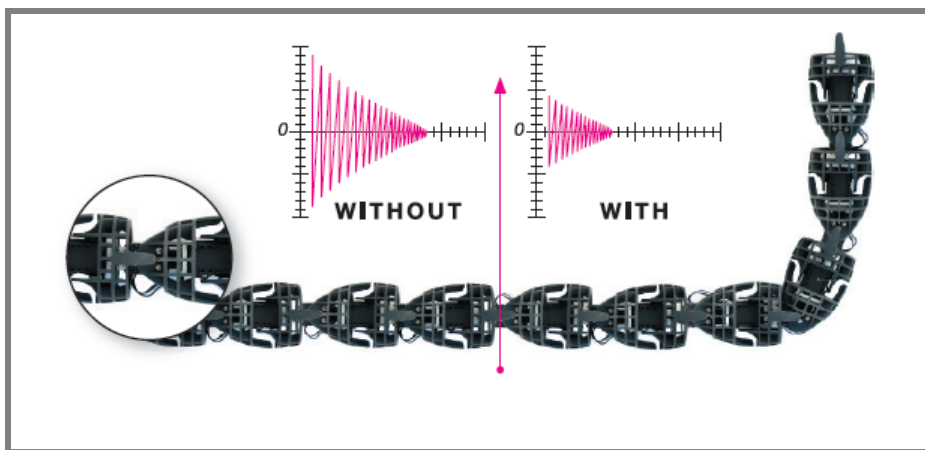
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