Liquid Dispensing Bath Scrubber

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Benchmark Product

The benchmark product, shown in Figure 1, is a generic back-scrubbing shower poof. It is made up of a 17-inch long, solid wooden handle attached to a nylon poof. The entire product weighs 0.52 lbs. This product inconveniences the user by requiring manual application of soap which proves to be messy and time consuming.

Testing of Product

The most pertinent test to the success of our product is the strength of the handle. To determine the failure loading of the handle, variable weight was used to apply known loading conditions to the handle. After testing at the area of minimum cross-sectional area a maximum loading of 200 lbxin was determined to cause failure of the benchmark handle. The testing process is shown in Figures 4 and 5.

Design Requirements

The following criteria were important in developing the new design:
- Firm, leak-proof attachment to handle
- New handle comparable in strength benchmark handle
- Holds at least 8 oz of soap
- Handle is easy to refill
- Handle at least 18 in. long
- Weigh less than 1.5 lbs

Testing of New Design

3D modeling was performed in SolidWorks, see Figure 3, in order to prove the proof of concept. The design consists of a handle with guides, the internal actuator that slides through the handle guides, a suction cup at one end to release soap, a pushbutton on the other end to break the seal of the suction cup, and a no-slip grip.

Abaqus modeling was then performed to analyze stress and displacement of the handle under maximum loading conditions, 11 lbs. These models are shown below in Figures 6 and 7.

Modeling New Design

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Conclusion

When compared to the benchmark product, our design is more convenient and easier to use. Our bath poof incorporates a liquid soap injection mechanism and an anti-leakage seal to enhance the everyday showering experience.

Marketability

The benchmark product has a large market as it is easy to use and can be part of everyone’s daily routine. The improved product’s added convenience and efficiency saves the user time, and the seal makes it portable as it won’t leak while traveling. Consumer survey results have shown that a majority of potential customers are excited about the improved product and would be willing to purchase it.

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