

When I was coming up with my idea for retractable poi I was amazed by the fact that it seemed as if not many people had thought of it before and my main issue was how to fit something retractable onto an arm. I performed some background research on previous designs and what basic poi are made with and then fashioned my idea for my design from there.



For my background research I looked at what materials and designs traditional poi are manufactured with, a retractone performer's idea for small retractable poi. Materials that big-name flow arts props sellers such as flowtoys and Flow on Fire use are silicone and rubber for the poi themselves so that they do not get dirty and can easily illuminate. The string is typically stronger smithy cord or other cord for durability. Shown here is flowtoys' podpoi[®]v2.

The idea for the small retractable poi was similar to the design I had thought of. Their idea was to attach the retractable keychain to a mini Flowlight (small LED glowstick) and attach that to a

bracelet as a small fidget toy.

Another idea for a small retractable mechanism comes from an Amazon product called YoYo Poi, which is a cloth armband with a reel and carabiner attached. This did not have much feedback on it but seemed very bulky and unattractive.

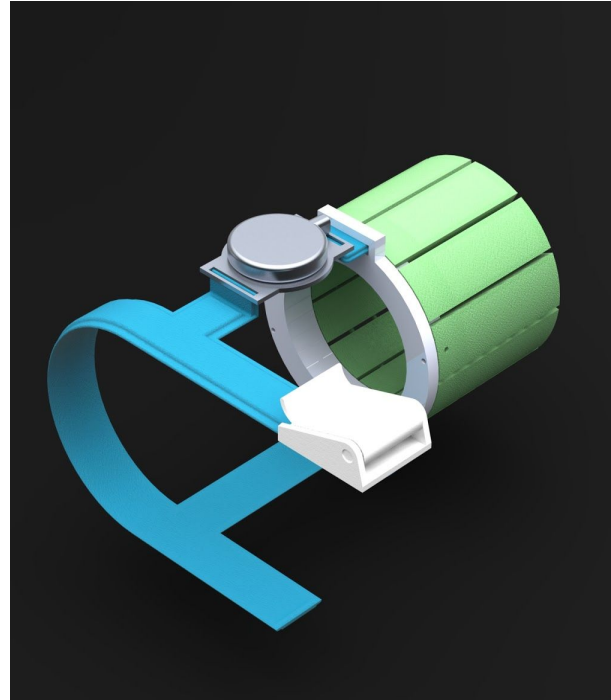


The design that I came up with operates as follows. To put the device on, the performer simply slides their arm into the armband and poi panels and threads the neoprene band through the buckle and locks it. In order to use the poi, the performer would tug on the panels to their desired length and then lock them into place. To stop, the performer pulls and the keychain retracts the string back to the arm.

Considerations for the user that I made were including comfort, ease of use, and style. It must be comfortable for performers to wear as they would most likely be wearing it for a long time. This is why I opted for as little material as possible, using neoprene for the straps and silicone for the panels of the poi, with the only hard objects being the plastic armband and the aluminum retractable keychain mechanism. It also must be quick and easy to use because most likely the performer would not like to disrupt the pace that they are going at and would like something easy and intuitive, which is why I implemented the retractable feature. The design is sleek and fashionable and its glow-in-the-dark capabilities will end up making the device look very futuristic and hip.

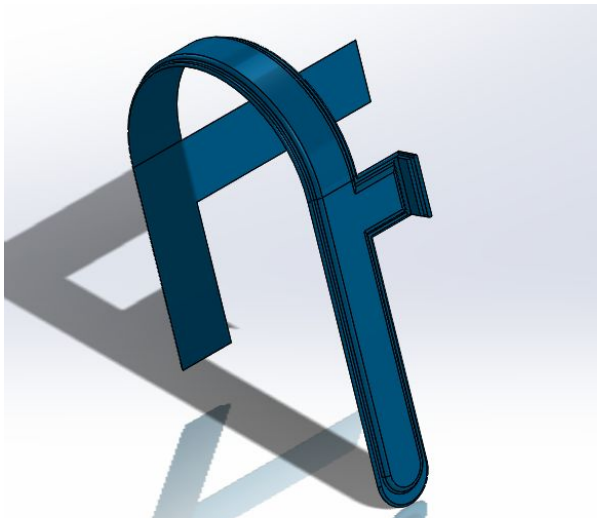
For manufacturing, did not make the holes for anything too small or leave sharp edges that could not be machined. The silicone parts would have been created with a 3D-printed mold and then filled with bioluminescent fluid, then sealed with more silicone, and the hole can easily be drilled out without too many problems.

Problems that I encountered when modeling the device were trying to figure out how to model fabric and how to create string. For modeling fabric, I made two layers and then filleted the edges and then I decided to use the Flex sketch feature, which was not perfectly exact but with some trial and error it worked to some degree. I also originally wanted to make the material leather but I could not find that, so I settled on neoprene instead. On the engineering drawing, I decided to leave all of the fabric parts unfolded as much as possible for ease of manufacturing.



The finished product.

Creating string was difficult to do in three dimensions so I decided for the sake of the drawing to leave it out, but the string would just connect from the keychain to the two holes on the armband into the two holes on the panels.



Overall, making the Retractable Poi was a very interesting challenge. I learned a lot about manufacturing techniques and CAD techniques that I had not previously used and got valuable experience creating a video, assembling a working drawing packet, and making something that I believe fills a gap in the market of flow props.