

Ergonomic Improvements for Operator Tooling

The operator tooling fixture implemented by the team was the first generation of a product that is expected to evolve. The team fully expects there to be changes made to the current design, introducing newer generations of our design. It is our hope that the first generation of the operator tooling provides a baseline for the future design of the fixture. The team came up with additional changes that could be implemented to the current fixture in anticipation for these changes.

The first issue with our design that may be faced is the varying hand sizes of the operators. For large hand operators, the tool may not extend long enough, putting their hands into unergonomic positions. To combat this, the team created a Tooling Extension in Solidworks that would simply make the operator tooling longer, if needed:



Tooling Extension

The tooling extension could easily be attached to the end of the tool when needed, and just as easily be taken off.

Additionally, the team noticed that in the initial trials of the operator tooling testing, the operator's hands were often not resting entirely on the plate provided, and on the rods instead. To combat this issue, the following design for a plate extension was brought forward:

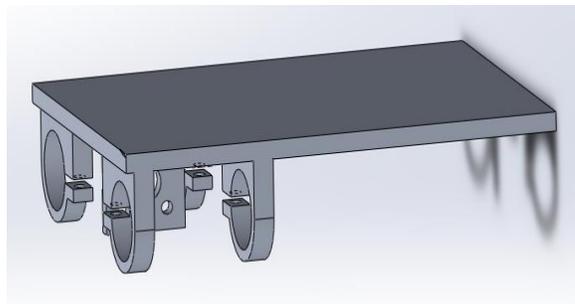
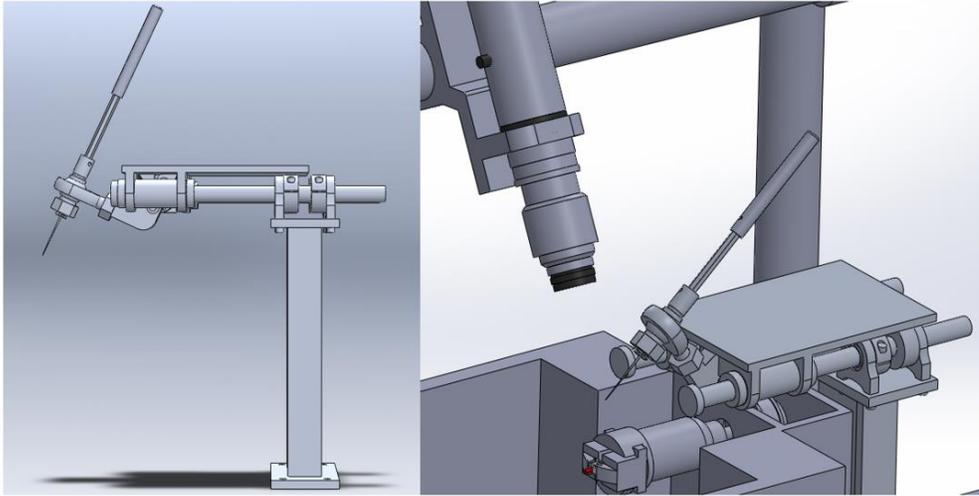
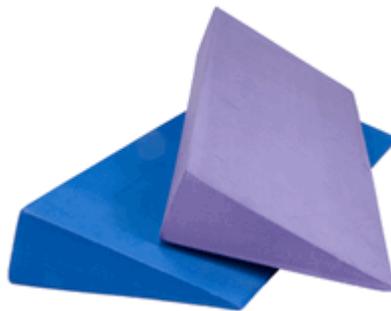


Plate Extension

The extension would simply be replaced with the current sliding platform that is on the tooling fixture. The following picture shows how the two different extensions would fit into the over scheme of the operator tooling fixture:



The current surface that the operators are resting their wrists on is an aluminum surface, which, is un-ergonomic for resting a hand for a long period of time. To combat this issue of surface “roughness”, a recommendation for a foam support was presented to the customer. It would be glued or taped onto the platform as an ergonomic place for the operator to place their wrist when performing the touch up procedure. The product we need to buy is a “Yoga Foam Wedge” seen here:



Foam Support

http://www.sunshinyoga.com/foam-yoga-wedge.html?qclid=Cl_NiOnq98sCFQ9ZhgodNTsF5w

The wedges are 20" long, 2" tall, 6" wide. They will need to be (and can easily be) cut to the correct dimensions. The cost for one of these wedges is \$9.99.

Short Term Operator Tooling Recommendations

Since process improvements often take long periods of time to implement, the following recommendations are going to be presented to the customer as an interim solution to the ergonomic issues presented to the operators:

- Implement the camera and monitor viewing the part even if the tooling fixture is unfinished, and remove the microscope. The operator’s neck tension stems mainly from the un-ergonomic position that the microscope forces the operators to put themselves into.
- Extend the cover that covers the chuck, and add support (such as the foam support shown above). The issue currently with the cover that is implemented is that it is a hard surface with no “give” to it. The foam wedges recommended by our team are meant for eliminating this issue.

- Have the operators “ease” into the new process. The operators need to take on multiple new roles when it comes to the process (no more “free hand” movement, and no more microscope). Introducing these new process changes one at a time (or piece by piece) will help lower the learning curve for the operators. In addition, if at all possible, have the operators take shifts at the station, exposing everyone to the new process.