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Strengthen Servo Splines in 3D Printed Brackets

I wanted to share a little trick with you that I came up with for strengthening 3D printed servo splines that come under lots of stress. A robot shoulder or ankle bracket is a good example of this. I found that when you print out brackets that interface with a servo motor the splines don't always come out with a good resolution. The 3D-printed plastic splines have a tendency to strip under high stress. Here's a tutorial to try to combat this issue.

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Step 1 - Find a metal servo output gear

Find a metal output gear from an old servo.

Step 2 - Remove the plastic within the gear

Remove the bearing and the plastic part that interfaces to the potentiometer that resides inside the output gear. If the bearing can't be removed, drill out the plastic with a 7/32" drill bit and remove the excess with a pick. You'll need to have a bare-metal connection.

Step 3 - Press the gear into the 3D printed bracket

Line up the metal output gear with the splines in the 3D plastic part and get it started by pressing it a little ways into the bracket.

Step 4 - Press on the gear with a soldering iron

Heat the metal gear with a soldering iron inserted into the middle of it. You could also use hot air with a small nozzle to heat up the gear. Once the metal gear starts sinking into the bracket press down on the soldering iron until the gear splines just disappear, then remove the heat source.

Step 5 - Wait for cool down then remove the gear from the plastic

Wait a few minutes for the metal gear to cool down, this is important because as long as the metal gear is hot the plastic will be soft. You want the plastic to be solid when you remove the gear. You also don't want to burn your fingers!!! Wear gloves just in case! Once the plastic is back to it's solid state, then remove the gear.

You should now have a 3D printed bracket that will have a more solid interface with a servo! Best of luck!