A Better way to insert O-rings

Overview
Inserting O-rings into hydraulic valve housings has been one of the most frequent worker complaints at Bosch Rexroth, Bethlehem for a long time due to the force required and too much time variation gap between experienced and inexperienced worker. Bosch is then in need of a better ring installation method that would reduce the worker’s fatigue and also standardize the process time.

Objectives
The main objective of this project was to create an O-ring insertion tool to help Bosch Rexroth with inserting O-rings into hydraulic valve housings. The main purpose of this is to help operators in the production line to insert these rings easily in a smaller time frame.

Approach
- A few housings and rings were donated by the sponsor company to the team for experimentation.
- The team first tried to insert rings into the housings just like the operators would to get a feel of how tough the actual process is.
- Then the team analyzed the customer needs and prioritized the categories that were considered important.
- Various concepts were discussed upon but the “Ring Injector” was finally decided upon.
- The team searched about various patents that exists so nothing in that area was touched upon.
- Solidworks was used to create the model, and also for further iterations.
- Prototypes were manufactured by 3D printing to have quick turnover times, within the budget.
- Testing was performed with every modification made with the prototype to find out what kind of changes are needed, if any.
- Rings were coated with powder to prevent them from sticking to each other, since it was a major issue.

Outcomes
The main outcome for this project was the creation of the prototype “Ring Injector” that constantly inserts an O-ring
- The sponsor will now have a standardized measure for how long the process of “inserting an O-ring into a housing” will take.
- This process takes about 10 seconds for every operator.
- The cost of the developed solution is under $100
- This process is extendable to other O-ring functions with simple design adjustments.