



T&T Tools Rod Threading Machine

Team 22

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Faculty Advisors

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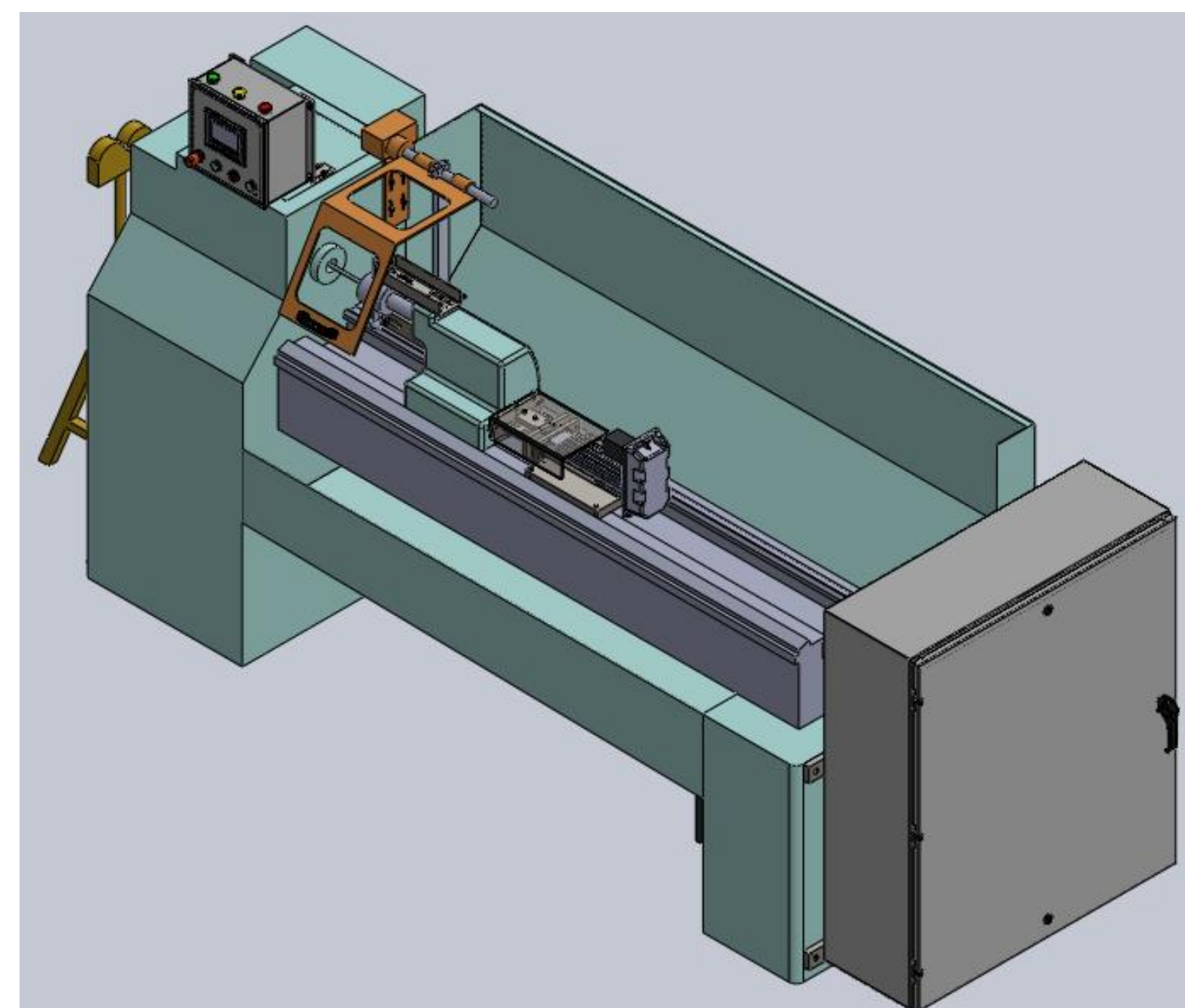


Major Components

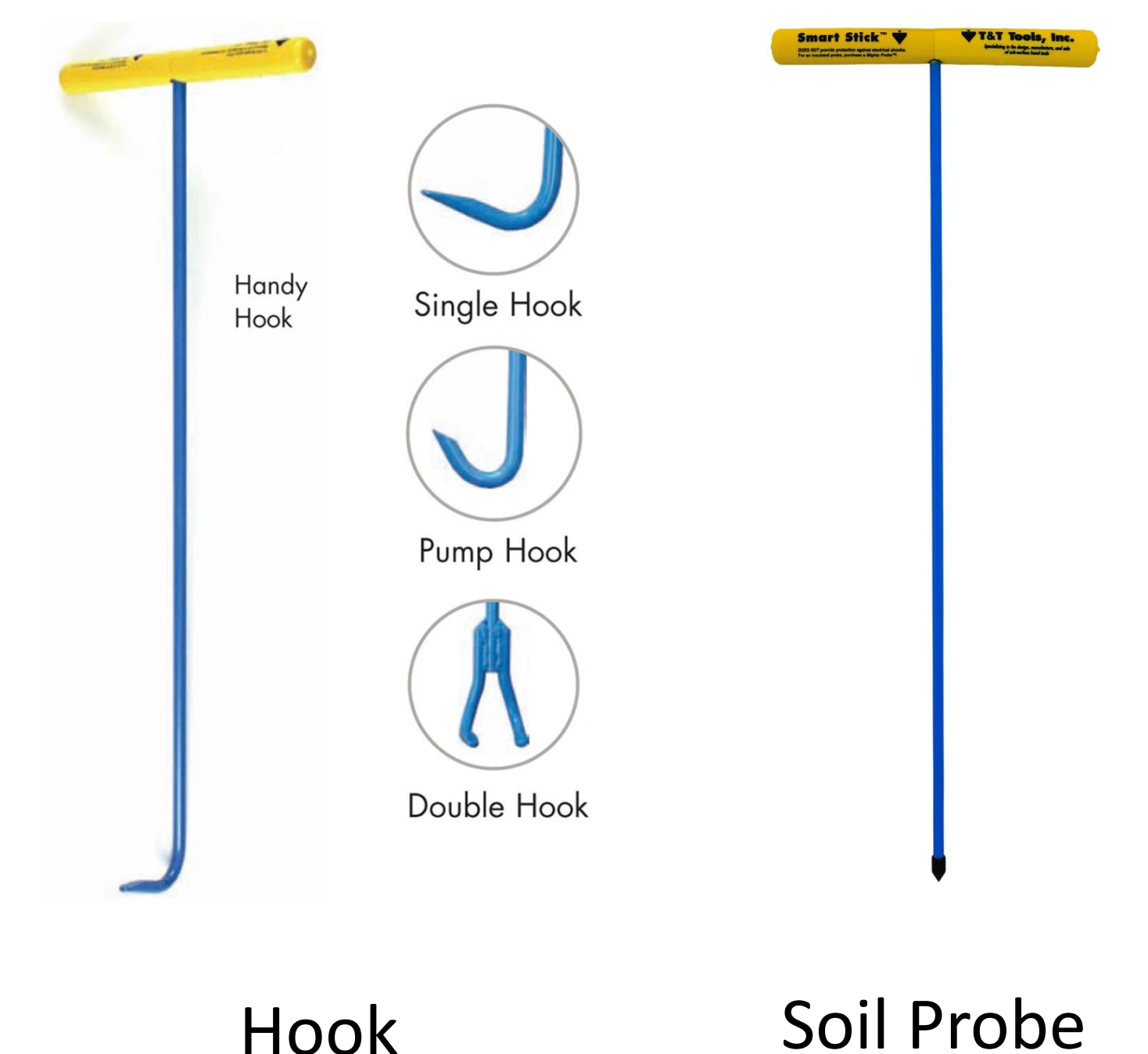
- Micro 850 PLC
- PanelView 800 HMI
- Kinetix 5100 Servo Drive
- Kinetix TLP Servo Motor
- EDRIVE Linear Actuator
- Geometric Style Die Head
- Graymills Coolant Pump
- Leblond 15" X 50" Lathe

Purpose

The sponsor, T&T Tools, would like an automated rod threading machine. The machine needs to apply $\frac{3}{8}$ -24 threads to $\frac{3}{8}$ " steel rods. Two different thread lengths are to be produced ($\frac{3}{8}$ " and $\frac{7}{8}$ "). A stretch goal for the project is to be able to thread $\frac{1}{2}$ " rods with $\frac{1}{2}$ -13 UNF-2A threads having a thread length of $\frac{15}{16}$ ". The proposed solution for these requirements is to retrofit and automate a manual lathe using a Type D die head to apply the threads. A PLC combined with an HMI will be used to control thread length, rod size, and length adjustment. A servo and linear actuator will be used to guide the Type D die head onto the rod to apply the threads. The loading and unloading process of the rods is manual.



Products



Prototyping



Prototyping involved creating a manual version of our final design. This allowed for testing thread quality, the speed at which the spindle could be run at, and the forces required to start and stop threading.



Scan here to see our prototype in action!

Testing



Thread quality is verified using a set of go/ no-go gauges. In a runoff of fifty $\frac{3}{8}$ " and twenty-five $\frac{1}{2}$ " rods, 5% can fall out of specifications for each rod.



Thread length is verified by measuring the distance from the end of the rod to the end of a nut that is fully threaded on the rod. The thread length has a tolerance of $\frac{1}{16}$ ".