Design

Wire Whip End Fixing System

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Neck

• Encore Wire spends substantially to properly recycle their production scrap
• They also want to enter a new market sector of selling short wire whips.
• Our project allows them to create new product out of scrap material.

Products

• Attach Bridgeport fitting to end of armor
• Strip 1” of insulation off of conductor ends
• Automate the wire stripping process
• Allow operator cycle time of 30 seconds per whip

Requirements

Design

• Bridgeport Fitting Magazine
  • This allows the wire whips to be attached to electrical fixtures
  • Housed in a “magazine” that holds 84 fittings
  • Attached as operator pushes whip through machine

• Clamp
  • Necessary to ensure that wires do not move within armor

• Insulation Stripper
  • This cuts and removes the insulation from the conductor ends
  • Pneumatic cylinders actuate blades up/down and forward/back
  • Custom manufactured blades
  • Rides on linear bearings

• PLC and Sensors
  • Sensors automate the untwisting die, clamp, and wire stripper, communicating with the PLC to activate the motor and pneumatic cylinders

• Untwisting Die
  • This separates the coiled conductors allowing the insulation stripper to function
  • Stepper motor turns a die that untwists conductors using a chain drive

Challenges

• Our project is unique in that we have to deconstruct raw materials to create a final product.

• The insulation stripper had to be made using fine tolerances on CNC machines and has many moving parts

• The untwisting die went through many iterations and was extremely complex to manufacture

Project Future

Our Project takes Encore halfway to their vision of automating their new recycle-and-sell process. Our system requires whips to be cut to the correct length and the outer armor also cut off at the proper length.

Encore has already prototyped another system that allows those steps to be performed easily and accurately.

The final steps will be refining and integrating both systems and incorporating them into production.

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