

Power Transfer Connector Assembly System

Background

Advent Design's client manufactures a variety of connectors. The client designed a unique connector that significantly decreased the labor associated with installing television cable connections on telephone poles. The connector was a 1" x 1" circuit board with a pin and lug-screw swaged to the board. The product was very well received by the marketplace and Advent's client approached Advent Design with regards to designing and building an automated assembly system.



System Description

Advent designed, built and installed a system to automatically populate a 10 x 7 array of circuit boards with pins and lug-screws. In summary the system consists of the following stations:

- **Load Station** – A stack of empty boards is placed into this station by the operator. Each board is automatically picked up using suction cups and transferred into the lug-screw insertion station.
- **Lug-screw Insertion Station** - The lug-screw insertion station includes a feeder bowl which automatically feeds lug-screws to a pick and place mechanism. Small flat sides exist along the round barrel so that the bottom of the lug could be inserted into the correct rotational orientation into a square hole. Once inserted, the lug-screw is swaged in position using a pneumatic multi-stage press.
- **Pin Insertion Station** - The pin insertion station also includes a feeder bowl that automatically feeds pins to an escapement. The escapement drops the pin directly into the swage nest. Again, a pneumatic multi-stage press swages the pin into the circuit board.
- **Eject Station** – Completed 10 x 7 arrays are ejected into a completed boards bin where they accumulate until removed by the operator.

The system used an x-y table to move the circuit board arrays under each of the automatic insertion workstations. After the circuit boards are correctly positioned, both workstations simultaneously insert and swage the lug-screw and pin. After the system has completed swaging components into each circuit board in the array, the x-y table returns to the home position and a pneumatic overhead pick and place device engages each board and indexes them to the next station.



Impact

The system requires less than one operator and runs 5-second cycle time per insertion. Advent Design's client was able to meet a new market demand while minimizing the need for manufacturing floor space and labor.

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