



## Case Study –Pinion & Shaft Load Unload

This manufacturer of pinions and gear sets faced the challenges of growth by automating machine tool load and unload and the inspection and gauging activities in the first machining process in making pinions.

### Overview

Manually loading and unloading machine tools, in this case horizontal lathes, requires that an operator be in place in front of the machine tool or nearby on an almost constant basis. The requirement to be at the door when machining is complete leave little time for the operator to be involved with more value-adding activities.

These systems either pick parts from a bin using vision to locate the parts and/or from multi-level gravity racks; load and unload the lathe and place the machined part either into the outgoing parts bin or into and out of a gauge, then into the outgoing parts bin. The operator is freed up from the daily grind of tending the machine and with this customer; he became a higher-level operator over many such cells.

Other than the incoming parts being delivered to the cell and the full finished parts bin being taken away – both by forklift – the cell runs continually by itself. The operator can now focus on gauging and process improvements, as well as share his time with, in this case, three other similar automated cells.

### System Requirements

- Run 16 different parts – some are sections of bar stock, others are forgings
- Direct labor savings and reduction of labor involvement
- Vision pick from bins with layer style dunnage
- Also pick shaft raw parts from the TEC gravity rack system
- Deliver finished parts to same style bin
- Meet the financial goals set by the customer
- Turnkey through on site start up and acceptance



One of the cells from the part loading aisle



What's inside a typical bin



A view of the heavy part cell

The end-of-arm tool for the heavy cell

### **Description of the Solution**

TEC designed and built several of these cells to automate the whole department. This started the customer on an ongoing effort to automate processes further down the line.

The robot picks parts either from the customer bin using a TEC designed and built overhead-mounted camera and integrated vision system or the TEC adjustable infeed racks, moves to the TEC part regrip stand and regrips the part for best datum control, moves to the lathe door and upon its opening and a sharing of signals, enters the lathe, grips the finished part and places the incoming part, then places the finished part either into the gauge or the exiting parts bin.

TEC used ABB IRB4400 and IRB6600 robots for these cells. The TEC end-of-arm tools used double grippers with replaceable, non-marking finger inserts. One robot end-of-arm tool is used for the range of parts. The CNC control panel is located outside of the safety fence for access by the operator. One side of the cell is a light curtain for easy access by the forklift operator to the parts bins.

### **Customer Benefits**

- Consistent throughput
- Flexible solution for many part sizes and two part types
- No human touches of individual parts
- Safer work environment
- The indirect benefits outweigh the direct benefits

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