Case Study –Gear Blank Load Unload

This producer of power transmission gearboxes manufactures over 300,000 sets of pinions and gears each year. There are 20 process steps from raw material to finished pinion-gear pairs, many of which involve manual operations. This case study describes the load and unload of gear blanks into a twin spindle vertical lathe.

Overview

The gear blanks range in size from 6 inches to 18 inches in diameter and weight up to 220 pounds each. Prior to the robotic automation from TEC, operator loaded and handled the gear blanks either by hand or with the assistance of a manual jib crane with magnet tool. The raw parts are forgings straight from the foundry.

The twin spindle lathe uses a 3-jaw OD chuck in each spindle. There are two machining operations – the first operation faces one side and the ID of the gear blank and the second faces the second side. The operator would load the first operation, turn the part over and load the second operation. Gauging of the parts was done manually on a nearby bench.

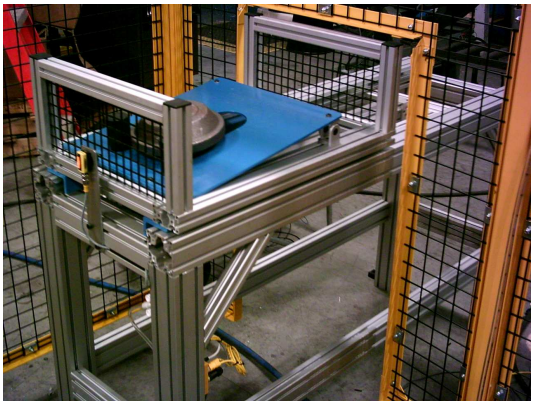
System Requirements

-Reduce labor involvement so the operator can attend to other processes
-Use one robot for the range of parts
-Load incoming parts as they come from the foundry basket
-Meet the financial goals set by the customer
-Automatically infeed the parts with 2 hours of queue time, load and unload the machine, turn the part over and load and unload an inspection shuttle
-Handle divider boards
-Provide access to the CNC control panel
-This was an older lathe – automate the doors, build a robot interface package and provide an interlock for the CNC control panel when it is out of the way of the automation
-Turnkey through on site start up and acceptance

View through the light curtain into the cell

The operators load raw parts here

Double gripper tool, infeed and regrip stand



Inspection shuttle

Description of the Solution

TEC designed and built a robotic workcell with a dual lane powered belt infeed; each lane to V-block fixture, TEC double gripper end-of-arm tool, regrip and part turnover assist stand, inspection shuttle, two floor details for locating the finished product onto pallets with divider boards, divider board vacuum tool and balance queue, perimeter safety fencing and light curtain for ease of access to pallets. The robot is a FANUC R2000iB/165F.

TEC Automation, Inc.

30 Hickory Springs Industrial Drive
Canton, GA 30115

Phone 770-720-3333
www.tec-automation.com