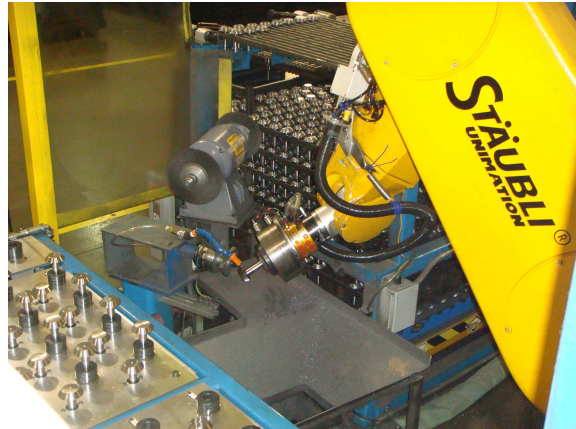
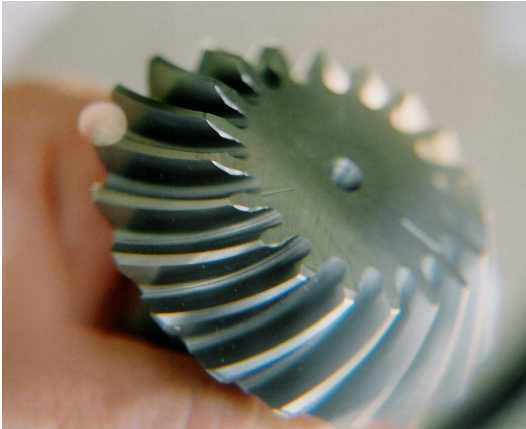


Case Study – Deburring Pinions

The customer is in the early stages of including flexible automation in the processing of precision shafts, gears and housings. The plant uses dozens of machine tools, various heat treat and material treatment facilities and assembly equipment for the manufacture of power transmission equipment. The plant operates 24 hours per day, six days per week.

System Requirements

- To deburr and chamfer cut gear surfaces to a close tolerance
- Process eight part numbers with the ability to expand the range of parts to be processed in the future
- Run economically and effectively in small batches
- Create an operator friendly environment
- Load and unload the gear cutting machine tool and the part washer
- Load cut and deburred parts into a company standard heat treat basket
- Meet the financial goals set by the customer for payback
- Keep the operator employed as the operator of this cell and additional equipment
- Produce 70 parts per shift
- Do not nick the parts
- Eliminate as many human touches as possible



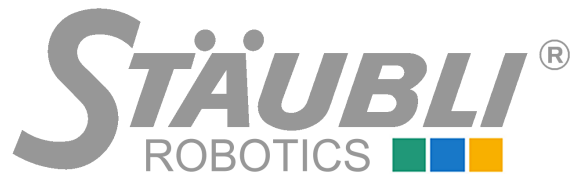


Description of the Solution

- TEC designed and built a two-shuttle infeed device with quick-change fixture plates. The fixtures used on the plates provide a solid and repeatable location for the robot to pick up incoming parts. The clever use of fixture location marking and the method used to "depalletize" the incoming parts created a robust and reliable part presentation scheme.
- The robotic end-of-arm tools included a handling tool and a deburring tool. The exchange from tool to tool was accomplished via an automatic tool changer. Once a part was unloaded from the machine tool, the robot sequence exchanged tools to the deburring tool.
- A part finding technique was used to locate the exact detail needed to begin the deburring routine. A fixed and non-compliant deburring tool was used. The rigidity of the robot arm and the deburring tool resulted in superior machining of the parts.
- Once deburred, the tool changer is used to return to the handling end-of-arm tool, the part exchanged with the part resident in the part washer, and the final part placed into the heat treat rack located in a floor locating detail. The heat treat rack types also vary for the part sizes run in the cell; this device is the only manual set up piece of equipment in the cell.
- TEC used the Staubli RX170 6-axis floor mounted robot with the CS8 controller, ATI tool changer, Schunk grippers and an Air Turbine 40,000 RPM pneumatic spindle for the deburring tool.

Customer Benefits

- 120 parts per shift realized, a 71% increase in throughput over the previous 70 parts per shift
- One human touch, down from five in the previous manual operation
- Heightened operator involvement with part quality in lieu of simple repetitive handling routines
- Work in process in the area was reduced by 50%
- Elimination of any idea that this process step would be a bottleneck to the plant



TEC is a Staubli Robotics Strategic Partner

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