

Genesis Case Study #: CS SO1061-001
Application: Robotic Material Handling / Material Removal
Market Segment: Industrial
Product: Crankshafts for 10, 11 & 13 Liter Diesel Engines
Cycletime: 3 Minutes



Summary

A Genesis two-robot system performs material handling, material removal and machine tending processes for the production of crankshafts for 10, 11 & 13 liter diesel engines. Crankshafts arrive in to the system from a series of automated gun drills via a Genesis-supplied conveyor with custom escapement. A Kuka KR200 robot (Robot 2) mounted to a 24 FT servo track picks the part with a pneumatic gripper and moves it to one of two workstations. Each station's servo trunnion is controlled by Robot 1 and features coordinated motion capabilities. Robot 2 rotates its end effector and deburrs the crankshaft counterweights and pin journal edges. Robot 1 chamfers, probes and reams the oil port holes in the pin and main journals with a servo tool changer mounted to an active force device. Both robots work independently/simultaneously at opposite stations, yet Robot 2 controls all auxiliary axes. Constant communication between robot controllers assures the parts are positioned properly for all processes. Finished crankshafts are moved to an induction heat treat machine by Robot 2.

Project Challenges

- Interface with existing machines that were never designed to be automated
- Achieve a deburring process quality that exceeds the existing manual operation in consistency and finish
- Installation during production
- Complex servo motion control with contour following on a moving part
- Harsh environment
- System must be simple to program / maintain as this is the customer's first robot system

Genesis Solution

- Two-robot System with one robot mounted to a 24' Genesis modular servo track. Kuka KR200 and KR150 Robots.
- Two servo trunnion workstations with custom tooling that is compatible with all models of crankshaft with no changeover
- Allen Bradley-based PLC control system with Genesis Production Screen HMI on the Kuka Teach Pendant
- Pushcorp "Big Tex" Active Force Device and Servo Tool Changer
- Manual load/unload stations for part quality checks and part banking with upstream and downstream processes stop
- Turnkey programming for three models of crankshafts
- Integrated connectivity for remote support by the Genesis Service Department