

Case Study –Dispensing Engine Seals

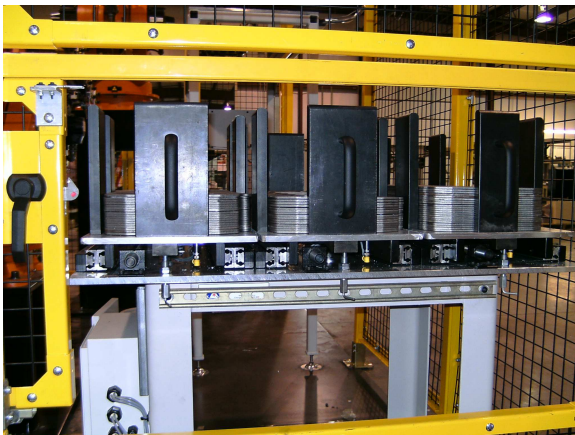
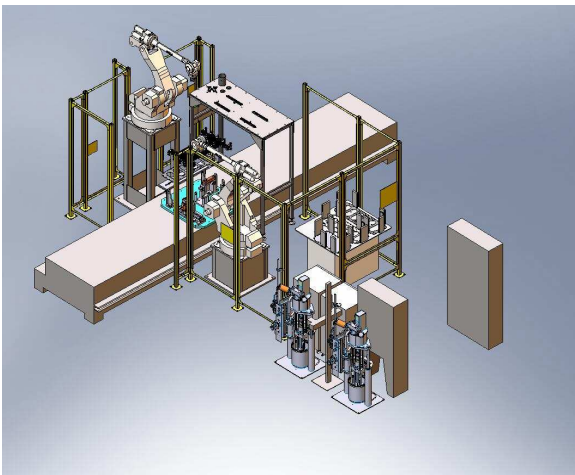
This manufacturer of diesel engines had the challenge to deliver one engine combination on demand in a continuously running pallet transfer style assembly line. The line manufactures in batches as small as one. There are 30 possible combinations and 16 base engine formats. This environment lends itself to robotic automation.

The sealing station in this case either seals and places bedplates (steel) to the engine blocks (iron) and places sealing material to the block for the oil pan to be added in the next station or places RTV sealing material directly to the engine block for placement of the oil pan in the next station only. The vast majority of engines passing through the station do not require the bedplate.

The material is an RTV that has been tested for the application.

System Requirements

- 99% uptime
- Part to part changeovers done seamlessly via link to the line PLC
- Drop in solution considering existing transfer line, pallets and block designs
- Coordinate with multiple equipment vendors and the customer
- Verify, handle and seal bedplates and seal blocks in 50 seconds





Description of the Solution

The existing line is a pallet transfer system with a lift at the dispensing station. The blocks are not fixtured on the pallet.

TEC designed and built a system with two floor-mounted NACHI SC50 6-axis robots, one TEC bedplate infeed shuttle drawer with details for three bedplate styles, one Nordson ProMeter dispensing system with dual/auto crossover bulk unloader, one Allen-Bradley ControlLogix PLC and operator interface package, a single camera Banner vision system, a laser distance sensor and a TEC magnetic bedplate flattening table fixture.

Several networks were running in the system including DeviceNet between the PLC and robot controllers and Ethernet between the vision system and handler robot controller.

The cell was integrated into the existing line and built to customer performance specifications. The run off of the system at TEC was as close to real operation as possible with stringent run off criteria.

One of the robots was designated to be the handler and was fitted with a TEC vacuum pick tool for lifting and placing bedplates onto the magnetic bedplate table. This robot was also fitted with the vision system and laser sensor to measure bedplate location and distance. The robot would locate the bedplate on the table and provide part position information to the other robot, designated as the dispensing robot. The handler would also place the bedplate onto the engine block once the seal was dispensed onto the bedplate.

The dispensing robot carried the nozzle and applied material to either the block (all cases) and as needed the bedplate to the path designated for the part. The path was adjusted for each part as measured by the vision system and laser sensor.

The customer's strict requirements for bead size and quality were adhered to.



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