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Transfer-Case Manufacturer Cuts Downtime with HAN-TEK Robotic Solution

HAN-TEK's Dual Robot Multi-Machine Loading System Permits Faster, Less Expensive Spline-Rolling Operations

APPLICATION: Robotic Multi-Machine Loading

INDUSTRY: Automotive/Manufacture of Spline Shafts

KEY COMPONENTS:

- ◆ Floor-mounted M710iB Fanuc robots
- ◆ Infeed and outfeed pallet conveyors
- ◆ Dual part end effectors
- ◆ Safety fencing with request-to-enter and emergency-stop controls
- ◆ Custom software that controls conveyor, robot and machine operations

BUSINESS ISSUE:

The customer aimed to reduce labor costs, improve throughput and trim downtime by automating the movement of spline shafts into and out of three separate gear-rolling machines. The goal: To complete one spline in 21 seconds.

SITUATION:

The customer, a manufacturer of spline shafts for transfer cases of trucks and four-wheel-drive vehicles, previously loaded and unloaded spline-rolling machines manually. Several inefficiencies in this process were evident:

- ◆ Laborers loaded and unloaded machines at varying rates.
- ◆ Bins filled with splines in various stages of completion had to be moved from one machine to the next, requiring labor and fork trucks.
- ◆ Spline rolling ceased when operators took breaks.

HAN-TEK SOLUTION:

HAN-TEK designed, built and installed a Dual Robotic Multi-Machine Loading system that automatically moves parts into and out of three machines that perform distinct gear-rolling operations, eliminating the need for two of the three laborers required for an all-manual operation.

With the HAN-TEK system in place, an operator loads four raw parts onto a custom-designed pallet that travels along the infeed chain-driven live roller (CDLR) conveyor to Machine 1.

Robot A uses one of its end effectors to take an unprocessed part from the staged pallet. With its second end effector, it removes a previously processed part from Machine 1 and places the raw part in Machine 1 for the first spline-rolling operation. Robot A then moves the processed part to Machine 2, and returns to the infeed pallet to repeat the process. When Machine 2 completes its operation, Robot

Customer Value at a Glance

Using a HAN-TEK Dual Robot Multi-Machine Loading solution, a major manufacturer of transfer-case axles reduced labor costs in its spline-rolling operation by two-thirds.

This HAN-TEK solution also provides:

- *Increased throughput.*
- *Advanced safety features.*
- *Automatic error recovery.*
- *Efficiency and uninterrupted production.*
- *Flexibility to handle 16 different parts.*
- *Expandability.*

B removes that part to Machine 3 and, subsequently, to the outfeed pallet, while continuously moving parts from Machine 2 to Machine 3.

Once Robot B has placed four completed parts in an empty outfeed pallet, the filled pallet travels along the conveyor to the operator, who unloads it for further processing in the plant.

Central to the HAN-TEK solution are customized controls that regulate the robots' movements; a programmed "handshake" allows them to operate in the same area without interference. Controls also prevent the robots from causing damage by colliding with unexpected obstacles.

CUSTOMER VALUE:

- **Significant labor savings.** Using the HAN-TEK Robotic Machine Loading Solution, the customer reduced its spline-rolling operation by two people -- a labor savings of about 67 percent.
- **Increased throughput.** With two cells operating at 80 percent, the HAN-TEK Robotic Multi-Machine Loading solution processes one spline every 18 seconds, exceeding the customer's requirement.
- **Advanced safety features.** During normal operation, the robots are controlled externally. When maintenance or reprogramming requires an operator or service technician to enter the cell, a request-to-enter function moves the robots to a safe, stopped position. Safety fencing prevents any unauthorized entry into the cell; when a door is opened, the system shuts down.
- **Automatic error recovery.** After any system shutdown, the robots can be restarted from where they left off rather than returning to the beginning of an operation.
- **Efficiency.** Custom HAN-TEK software integrates and economizes all robot and conveyor movements. When choosing one of four parts from a pallet, Robot A is able to detect the location of the next available spline without wasting motion. Empty pallets are automatically shifted to the outfeed conveyor, and a signal alerts Robot B that a pallet is ready to receive a part.
- **Uninterrupted production.** Because the HAN-TEK Robotic Machine Loading conveyors can accumulate parts at both ends of the production line, the system continues to move splines in and out of machines even when the loading/unloading operator is on break. The HAN-TEK solution can work three shifts a day, 365 days a year.
- **Expandability.** The customer has the option to install an additional HAN-TEK solution that uses robots to load and unload pallets to and from the conveyors.

To learn more about HAN-TEK automation, crane, hoist and other solutions, call HAN-TEK at 800-836-0237, visit www.HAN-TEK.com, or write sales@HAN-TEK.com.

HAN-TEK, Inc., an ISO 9001:2000 registered company, customizes advanced automation technology to optimize manufacturing-assembly and product-distribution systems. Founded in 1961, HAN-TEK specializes in overhead cranes, integrated conveyors, and systems automation and controls.