

Conveyor Case Study #5

Power and Free Conveyor for Painting Automotive Parts

The Challenge

Spraycon Inc., a paint finishing integrator, needed to supply a complete finishing system to handle 25 lb. machined automotive engine parts. The automotive customer required this finishing system to spot paint their engine parts at 7 precise points where the part had been machined for attachments. In addition, the customer had a very tight layout for this system and a cycle requirement of 1 part per 80 seconds minimum.

The Solution



PACLINE had worked with Spraycon in the past to supply various conveyors systems for their paint finishing projects. With no two projects ever the same, Ron Phillips (PacLine Project Engineer) worked closely with Mike Couteau at Spraycon Inc. to determine the best conveyor type and overall design to meet the needs of this automotive application.

The required finishing system had 4 separate zones that needed to operate independently:

- Part loading
- Spray painting
- Curing
- Part Unload

Due to the number of processes involved and the layout constraints, it was decided that a power and free or non-synchronous conveyor would offer the best solution.

The Results

The Spraycon finishing system with PACLINE's Power and Free conveyor resulted in a compact and highly efficient paint line for 25 lb. automotive parts. The complete finishing system consisted of 60 ft. of enclosed power and free track with a robotic spray paint system and an infrared cure oven – all contained within a 20' x 30' footprint.

The compact track configuration and efficient infrared oven saved not only space, but energy costs. The customer initially anticipated that two operators would be required but in the end the system required only one.

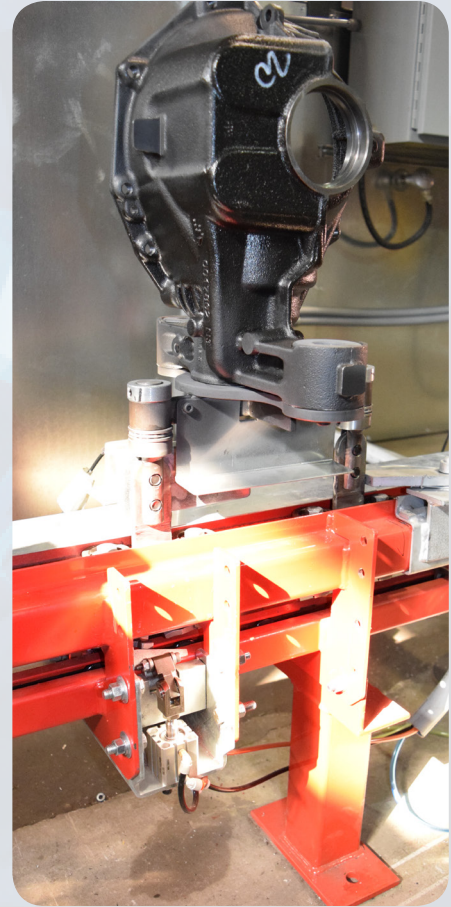
Why Power and Free Conveying?

Unlike a continuous conveyor system, the power and free conveyor is dual-track system that allows for each load-carrying trolley set to stop and start independently from the powered chain and to move loads independent from each other. Since the requirements of the Spraycon project involved 4 separate zones in the single conveyor loop, using a power and free system meant that parts could accumulate before or after each zone, as needed, or to stop within a zone for robotic painting or timed curing in the oven. On a continuous line, the floor space requirement for this would have easily been 3 to 4 times greater.

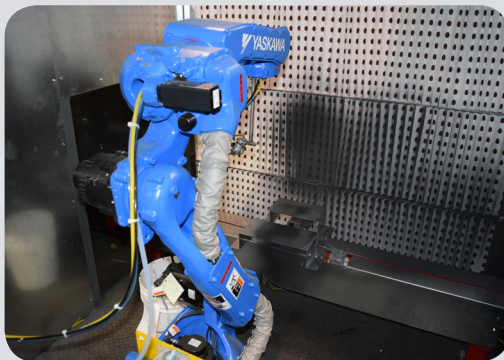
Why Was the Conveyor Inverted?

Another unique feature in this system design was the inverted orientation of the conveyor. Although the PACLINE power and free conveyor is typically used in the overhead orientation with parts hanging below the track, this system was designed with the conveyor mounted to the floor and in the inverted 'slot up' orientation.

Having the conveyor inverted provided better ergonomics for the operator loading and unloading the 25 lb. parts. This conveyor orientation greatly limited the amount of lifting and reaching required by the operator. Custom carriers were designed to further improve the ease of load and unload. In addition, the custom carriers were designed to ensure an accurate and repeatable part position in relation to the conveyor stops.



Robotic Spray Paint System



Incorporating a robotic spray paint system had a number of advantages. First, it required minimal space to operate which was particularly important for this installation. And secondly, since the parts did not require overall painting but rather spot painting, the robot could deliver this in a much more precise manner compared to hand spraying. With very little paint overspray, the system was kept clean and reduced wasted paint.

Infrared Oven for Curing

Spraycon Inc. is one of the first companies to develop and utilize a system that incorporates an infrared oven for paint curing. Compared to conventional curing ovens, infrared ovens take up far less space. Once again, this was an important advantage on this particular project. Another advantage is that parts feel cool to the touch after curing. On this project, this meant that the operator could immediately unload the finished parts without having to buffer them while cooling. Overall, an infrared oven is much more energy-efficient compared to conventional ovens. Infrared ovens need little time to get up to temperature and therefore, can be shut off during breaks and then start curing almost immediately when turned back on.

