

CROSS THREAD PREVENTION

Challenge

The customer needed to thread two sub-assemblies together and torque to a specific value. The old way of making this part was to spin some electric torque-driver tools, while actuating them to the part with air cylinders. What would happen is that the cylinders would slam the parts together, while the nut runner was just spinning, hoping to catch the tiny thread to start mating the parts. Most of the time, the system would rotate 4-5 times before being able to catch the thread and start the part assembly. A fraction of the time, this process would shear a part of the first thread off. This “Whisker” thread would either fall out, or in a worse case scenario, cause damage to all the other threads. When damage to the threads occurred, the part would continue to be assembled because the unit “Passed” the torque check. The part would only fail on the last station on the line: the leak test. The leak test would fail the part and all the extra time and money put into the product was scrapped along with the part, with no chance to re-work. This cost the customer around \$90,000 per year in scrap rates alone, not including lost time for labor or the process to scrap the parts.

Solution

Using the combined technology of closed-loop press and torque movements in our REMAP and the flexibility of our UltraPRO Controller, Promess was able to help this company retrofit our product into their existing station with little modification. First, the press moved the part that was nested in spring-compliant tooling. Next, we would gently apply pressure to the part in the range of 100lbs of force with the press axis. We then rotated the torque axis counterclockwise. During this movement, we collected the press force-over-rotation data which was essentially measuring the force on the part while rotating. Using this data, we looked at the lowest point of force and saved that position. This position indicated where the threads “clicked” together. Rotating to this known position, we knew we could begin rotation in the clockwise direction and on to torque the unit to its final specification.

Results:

Using this intelligent approach, the Promess solution was able to reduce the scrap rate of the part by over 80%, cut the leak test failures to almost nothing, and the system paid for itself within the first 9 months of use. Additionally, the overall cycle time was reduced by about 10 seconds. With the success of the first implementation, the customer has chosen to replace the other 3 lines with the Promess Solution and is in the middle of the second implementation.

