

# ADI OtoSense™ Quality Control Solution detects damage to parts during automated assembly

## Background

An international car manufacturer uses a robot to assemble an axle joint. The parts can be damaged during this process and, when they are, it often happens sequentially. The person in charge of this process can hear the parts tearing, but since he is monitoring several operations at the same time, he is not always there to detect the problem immediately. By the time he notices, many parts must be removed for inspection — slowing production, and some undetected damaged parts continue to be assembled. This defect does not pose a safety hazard to passengers, but it does cause a squeaky sound when the car is driven, which degrades the customer experience and thus the manufacturer's brand image.

**While a pressure sensor on the robot verifies that the joint has been inserted, there is no sensor to confirm the integrity of the parts after insertion.**



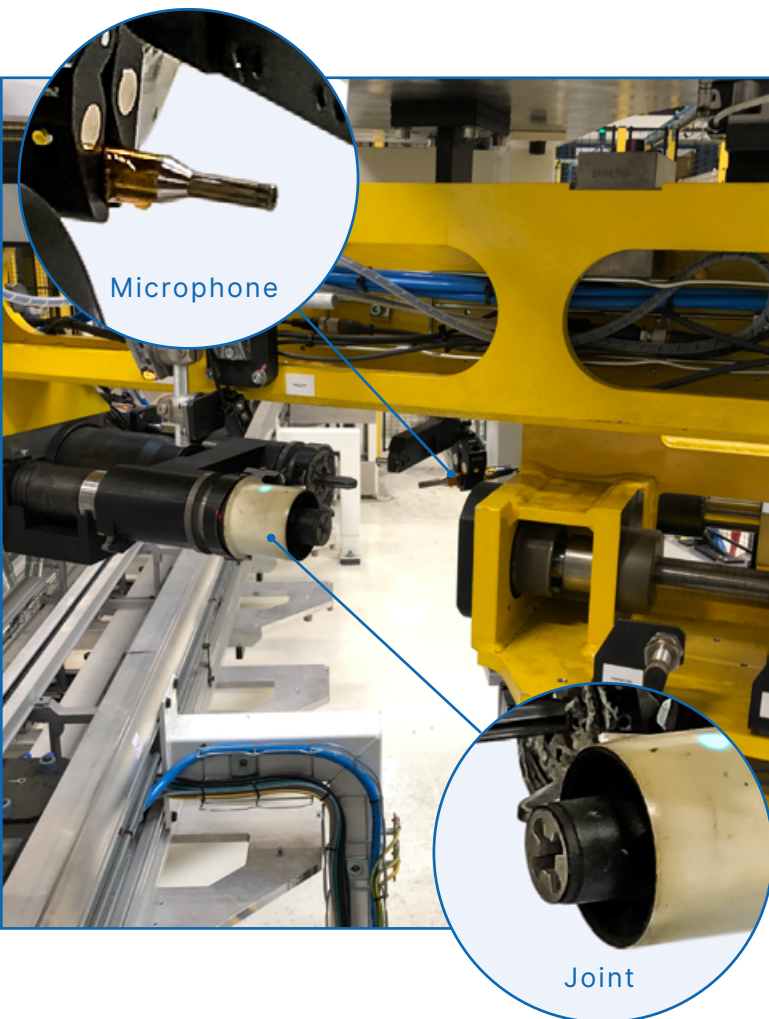
## Challenge

### Extract defective parts in real time

- Identify and track parts under test
- Detect anomalies during the insertion cycle
- Automatically extract suspect parts for manual inspection

## The solution

**2 microphones** installed on both sides of the assembly machine, to check the insertion of the left and right joints.



### **An industrial computer hosting the OtoSense software at the Edge.**

It acquires acoustic data and processes it in real time to assess quality. Models (created by the OtoSense AI) detect anomalies on either side of the assembly, allowing the PLC to send the command to remove the suspect parts.

**Connection to the PLC:** The OtoSense AI reads the barcode of the parts to allow their tracing, but also to apply the AI models corresponding to the type of car being manufactured. The software also reads the commands that go to the robot to trigger the analysis of the acoustic signals as it begins the assembly. Once the analysis is complete, the OtoSense AI transmits its result to the PLC.

### **OtoSense results:**

Defective parts are automatically removed. Alerts are displayed on a screen in real time, indicating whether the anomaly is detected on the left or right side of the part. The detection of three consecutive bad parts causes the assembly to stop automatically.

## The Outcome

The **first tests** show

# 100%

of the **damaged parts** are **detected** at the time of assembly.

### **Improved Quality**

Defective parts are immediately identified and removed.

### **Reduced Scrap**

The operator is alerted as soon as an anomaly is detected and the machine automatically stops after three faulty cycles, thus preventing the production of a long series of bad parts.

### **Increased Operational Efficiency**

The operator knows exactly when the assembly operations started to malfunction, and which parts are affected: he does not need to go back into the history of manufactured parts to test each part until he detects the beginning of the failure.