



**Fan Assembly
Solution Solves
Vexing Noise Issue**



CCTY



EXECUTIVE SUMMARY

An industrial sweeper OEM encountered a persistent, subtle noise within a fan assembly that was proving difficult to resolve. Frustrated by the ongoing issue, the OEM's design engineer reached out to CCTY for a fresh perspective.

CCTY's engineering team conducted a thorough analysis, reviewing the bearings, shafts, mating part prints and the assembly process. They quickly identified opportunities for minor adjustments to the assembly method.

With these fine-tuned modifications, the OEM was able to alter a few internal processes to eliminate the noise entirely—without incurring additional costs.

THE CHALLENGE

The fan assembly in an industrial sweeper produced a vexing noise under certain conditions. The OEM's internal team traced the issue back to the bearing and consulted CCTY's engineers for insight.

After a detailed evaluation, CCTY's team identified raceway brinelling as the likely cause of the noise, pointing to a subtle but impactful issue within the bearing assembly.



I want to say thank you!

The design-related analysis seems to make sense, and we will definitely keep those considerations in mind as the assembly improvements are put into place."

– OEM Design Engineer

“

As a manufacturer with a solution-focused approach to customer service, CCTY provides the benefit of partnering with our client's engineers for an outside look at design challenges.”

– *John Sweetwood*
CCTY Strategic Sales Manager

THE SOLUTION

Through a series of data exchanges, part evaluations and shared prints, CCTY's engineers considered several initial solutions, including:

- Producing an installation sleeve and new press fixtures;
- Improving surface finishes and chamfers;
- Adjusting the bearing's internal clearance; and
- Refining the assembly press fit.

Their analysis focused on the assembly process, which revealed an occasional misalignment of the bearing with the shaft could occur before the press fitting. This misalignment caused the press to exert force on the bearing's outer ring until it aligned the inner ring with the shaft.

In this misaligned state, the axial press force was transferred from the outer ring to the balls and then to the inner ring, generating enough pressure to brinell the bearing raceways. This brinelling left small dents in the raceway—similar to potholes on a road surface—causing noise every time a ball rolled over the dent, much like a car tire bumping over a pothole.

To resolve this, CCTY's engineers designed a simple alignment tool that the OEM could easily fabricate in-house. This tool ensures proper alignment of the bearing to the shaft before any pressure is applied. Additionally, they adjusted the press tool to exert pressure solely on the inner ring, effectively eliminating the cause of the noise.

THE RESULTS

The OEM was able to successfully modify internal processes to eliminate the fan noise without incurring significant additional costs. CCTY's solution provided:

- An optimized assembly process that resolved fan noise warranty issues and reduced internal quality assembly rejections;
- A cost-neutral improvement;
- A more streamlined approach to assembly; and
- An increased rate of qualified assemblies.

As a result, the OEM can now consistently manufacture quiet, reliable fans.





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