



Case Study: Improving Mill Quality and Production

CHALLENGE

Fender Musical Instruments Corporation is a world-renown guitar manufacturer. Its American production facility, located in Corona, CA, included an excellent staff of experienced guitar enthusiasts who were supported by excellent engineering and quality departments. The production facility was divided into different cells, and Fender was having two significant problems within its mill department:

- **Quality.** Fender recorded high levels of scrap and rework attributed to dimensional nonconformities.
- **Production Demand.** The mill department was struggling to meet production schedules with the recently implemented Just-In-Time scheduling method. The mill was equipped with 10 CNC machines, some of which had 4 heads that were capable of machining 10 parts per run. Despite the capability, the production schedule dictated that parts be run in small batches.

SOLUTION

The C2 Engineered Solutions team began to establish a baseline performance metric, set a goal and ideal state, and quantify the gap and opportunity for improvement. C2 Engineered Solutions determined that 80% of the defects in the mill were attributable to the CNC fixtures. These defects were categorized into either dimensional nonconformities or profile nonconformities.

- **Dimensional Nonconformities.** This attributed to tolerance stack-up between the 3 – 5/8” aluminum CNC fixture plates and the gaskets used to maintain the vacuum.
- **Profile Nonconformities.** This attributed to vacuum loss during the machining process, breaking free and experiencing an erroneous cut.

C2 Engineered Solutions completed the following to improve the mill department:

- Performed analysis of all rejected parts from the mill
- Categorized defects appropriately and analyzed results
- Determined that new CNC fixturing needed to be developed
- Designed and produced new CNC fixtures
- Trained mill staff on the new tooling



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RESULTS

The new CNC fixtures helped to serve multiple functions:

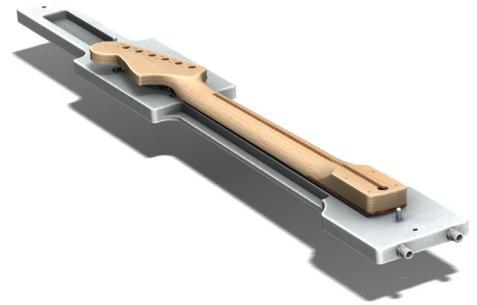
Quality

- **Dimensional Nonconformities.** Using one plate (as opposed to 3 with the original design) eliminated the tolerance stack-up that was occurring and producing dimensionally nonconforming parts.
- **Profile Nonconformities.** The new plate design was able to be bolted directly to the CNC table, which meant that the vacuum was only being used to hold the part down. There were also significantly fewer vacuum gaskets necessary, which significantly reduced the possibility of leaks. These design improvements virtually eliminated the profile nonconformance.

Meeting Production Goals

The existing fixture design required the operator to change out the plates, perform tool touch-offs, and correct offsets in the CNC with every change. This process would take approximately 30 minutes per product line change. Fender was running 10 CNC's with an average of three product line changes per shift on two shifts. This resulted in approximately 30 man hours of non-value-added time per day.

The design of the new tooling allowed for mill personnel to change production lines without changing any tooling. This eliminated 30 man hours per day of non-value-added time.



The C2E Advantage

C2 Engineered Solutions has decades of experience to work for you by assessing your equipment as well as your process reliability.

Contact us to get started.