

CASE STUDY 0100

Plastics Manufacturer Achieved a 944% ROI in 30 Days.

HIGHLIGHTS

The Challenge

The Strainrite Companies faced significant production issues due to faulty third-party sonotrode essential to the production of filtration products.

The Solution

Herrmann Ultrasonics created a custom-designed sonotrode to redistribute the amplitude and prevent cracking.

The Result

The re-designed sonotrode resulted in increased production, reduced downtime, and an incremental profit of \$100,000 or **944% Return on Investment**.

NEW Annual Production
120,000 units

944% ROI

\$120,000 Profit



Original Annual Production
90,000 units

CUSTOMER PROFILE

The Strainrite Companies
www.strainrite.com

Headquarters: Auburn, ME

Industry: Filtration Solutions

Employees: 77

Herrmann Ultrasonics expands capacity, improves scalability, and drives \$120,000 in profits through innovative sonotrode design.

The Strainrite Companies are a world-class, family-owned filtration business, operating for more than 40 years in countries all around the world. Their filtration products are vital in almost every industry including biopharmaceuticals, electronics, and beverages.

The Strainrite Companies faced significant production issues when their sonotrodes became prone to cracking, thus increasing the cost to produce filters and causing significant delays in the production output.

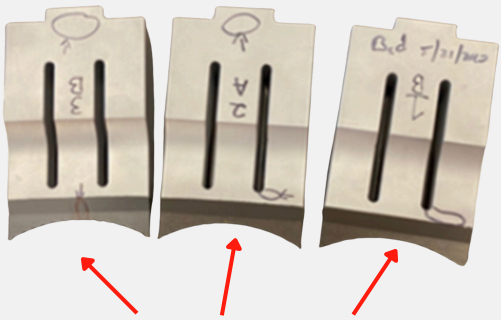
They needed an alternative solution to the existing ultrasonic sonotrode, one that would be highly reliable, increase their capacity and scalability, and reduce or eliminate production downtime.

The Strainrite Companies chose Herrmann Ultrasonics to develop a new and improved sonotrode that promised significant returns on investment, increased reliability, and improved tooling performance. Herrmann Ultrasonics analyzed the cause of their existing tool failure using Finite Element Analysis (FEA), and were able to design a new innovative tool which redistributed the amplitude and resulted in a more reliable sonotrode.

Benefits

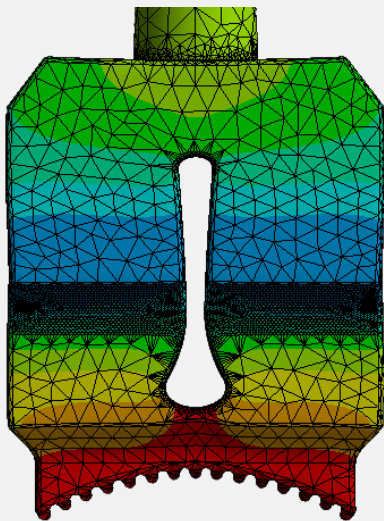
The Strainrite Companies have seen significant financial benefits from the newly designed sonotrode:

- **Increased Production Rate:** The production rate increased from 4 units per minute to 5 units per minute.
- **Significant Output Gains:** 60 additional units per hour, 2,400 more units per week, 120,000 additional units per year.
- **Financial Impact:** With an incremental profit of \$100,000 annually, and a staggering ROI of 944% with a payback period of just 160 hours (approximately one month).



Defective Sonotrodes

Strainrite's existing sonotrodes were prone to cracking every 9-11 months at the points indicated.



The novel tear drop sonotrode design

The FEA analysis of the teardrop sonotrode design shows the stress points evenly distributed evenly to prevent cracking. Herrmann Ultrasonics created a novel tear-drop shaped sonotrode for uniform distribution of amplitude.

About Herrmann Ultrasonics

As a specialist in ultrasonic welding of plastics, packaging materials, nonwovens and non-ferrous metals, Herrmann has been developing safe and efficient welding systems for over 60 years.

The Challenge: Improve Capacity, Scalability, and Reliability

A critical tool in the manufacturing of The Strainrite's Companies filtration products is the sonotrode. The sonotrode applies vibrations to generate friction heat which joins plastic materials together, and is essential in the manufacturing of sophisticated mediums.

The Strainrite Companies faced significant production issues when the ultrasonic sonotrode became prone to cracking. The poor tooling design led to three main problems:

- Every nine to eleven months the sonotrode would crack at the top and face of the sonotrode.
- Even a small defect in the sonotrode made the tool unusable. Because the tool could no longer vibrate, it halted the production of filters.
- The cost of replacing the sonotrodes became a significant expense.

The issues faced due to the faulty sonotrodes resulted in substantial financial losses. The inefficient tooling reduced production capacity and caused increased downtime. To continually replace this tool incurred significant expense. The Strainrite Companies needed a long-term solution that would enable them to reach their maximum productivity.

The Solution: Analyze and Re-design the Sonotrodes for Optimum Reliability and Performance

To address these issues, Herrmann Ultrasonics introduced a novel tear-drop design for the new and improved sonotrode. This new design featured a more uniform distribution of amplitude on the face, as depicted in the FEA analysis image, which showed improved performance characteristics.

The new sonotrode operated 3 seconds faster per 15-second cycle than the previous tool. This resulted in a more than **20% production capacity increase**. Because the production rate increased from 4 units per minute to 5 units per minute, this translated into a **25% output increase**.

By the numbers, The Strainrite Companies were able to produce 60 additional units per hour, 2,400 more units per week, and a 120,000 additional units annually. The overall return on investment of replacing the existing tooling with the custom sonotrode from Herrmann Ultrasonics was \$100,000 annually which calculates to a **944% ROI**, with a payback period of just 160 hours, or about one month.