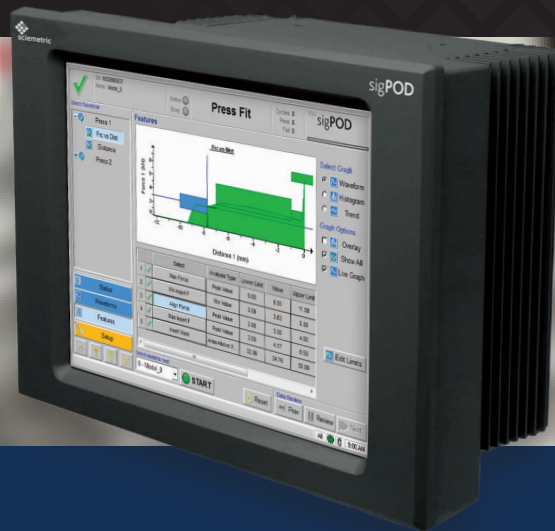


# Press Monitoring for Rotary Die Cutting Operations

In-Process Test & Monitoring Solutions



sigPOD equips rotary cutting die press with new predictive maintenance capabilities to reduce downtime, tool wear and scrap



To boost the dependability, efficiency and operating life of its products, a leading supplier of rotary cutting dies realized it had to deploy data-driven analytics to manage the operation of these high-speed and high-precision manufacturing systems. It turned to Sciometric's sigPOD, which handily proved itself capable of continuous monitoring and reporting of die performance in production real-time.

Rotary die cutting is a high-speed and high-tolerance precision manufacturing process that is used for applications as diverse as labels, automotive components and multi-layered parts. The material (which could be a thin metal, plastic, paper, foam, fabric or laminate) is drawn and pinched between a rotating cylinder that contains sharp cutting blades (the die) and a smooth cylinder rotating in the opposite direction (the anvil). The press which houses the die and the anvil can be calibrated to cut to depths as fine as the thickness of a sheet of paper.

Because a rotary die operates at such a high-speed and with such precision, maintaining perfect calibration is critical to avoid costly amounts of scrap and production downtime.

In some scenarios, it takes only seconds for hundreds of feet of material to be wasted due to poor cuts if the clearance between the anvil and the die is too great or misaligned. While some materials, such as paper, are obviously of low cost, the unexpected downtime of having to correct the issue can have a more substantial financial impact.

In addition, rotary dies are also used in complicated, multi-process rotary systems (an example is the production of adhesive bandages). Poor cuts early on the production line in these scenarios that pass undetected inflate the costs of scrap and waste downstream.

Lastly, if the die and the anvil operate with too little clearance and make harder physical contact with each other than necessary, it can shorten the life of the press components and increase machinery maintenance and replacement costs for the end user customer.

For this rotary die maker, using sigPOD to provide its manufacturing customers with the on-board performance monitoring and data analytics capability to avoid these issues and carry out predictive maintenance on their equipment represented a way to sharpen its competitive edge in the market.

### Reliable quality assurance, no matter the speed of production

The rotary die maker first deployed sigPOD on a setup designed to cut and shape plastic cup lids as a proof of concept.

Load cells were placed to measure the vertical force between the bearing blocks that support the die and anvil in the frame of the press. As the die and anvil rotate and sheet material is pulled through, sigPOD captures the force applied during cutting to monitor wear, as well as any changes in the die's alignment or clearance with the anvil during production, whether unintentional or planned.

The sigPOD was set up with process signature verification software that performed the calculation for sensitivity.

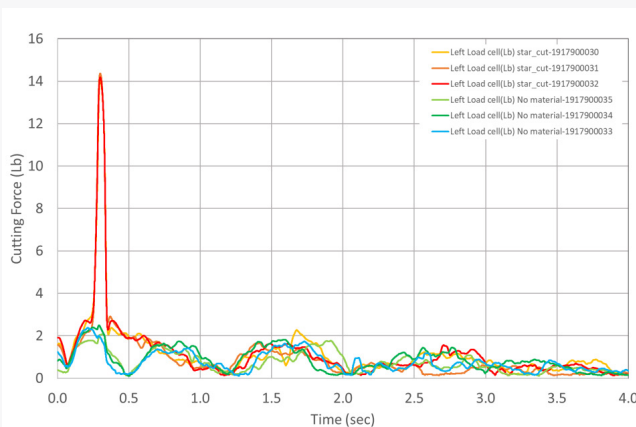
## Higher production yield, improved profitability and efficiency

- Decreased costly amounts of scrap
- Decreased production downtime
- Enabled predictive maintenance on equipment, improving lifespan and decreasing replacement costs

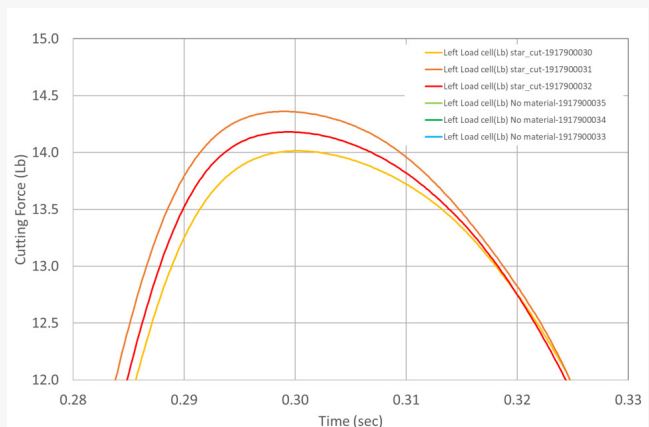
In this case, the load cells had a range of 10,000-lb full scale. The cutting force precision of interest was less than one lb, and the 16-bit acquisition board of the sigPOD handled this easily.

Figure 1 (below) shows an example of the cutting force for a simple star-shaped cutter. Three cuts in fresh material are shown along with three runs without material. This process signature captures and displays the cutting event clearly as the red spike, distinguishing it from the 8,000-lb constant static load of the rotary die press.

In Figure 2 (below), the 14-lb cut is easily discerned. The repeatability shown, which could also be described as the degree of variance between cuts, is less than 0.5 lb for the three cutting events.



**Figure 1:** This process signature overlay displays the cutting event clearly as the red spike, distinguishing it from the constant static load of the rotary die press.



**Figure 2:** The digital process signatures display the repeatability achieved during the operations. The degree of variance between cuts is less than 0.5 lb for the three cutting events.

The sigPOD is in its element, allowing continuous monitoring of the die cutting process for true quality assurance and process signature verification.

**Reliable quality monitoring that cuts scrap, tool wear, and downtime**

From Sciometric's perspective, a manufacturer's journey to Industry 4.0 begins with understanding how it can collect a great depth of data from its production line that it can use, today, for quality and productivity gains that previously were not possible.

While our focus is often with manufacturers that are carrying out serialized and discrete production, this use case demonstrates how digital signature analysis for in-process defect detection can yield tangible benefits for other high-speed manufacturing processes.

These benefits can be realized by OEMs and their suppliers, as well as manufacturers that are tool makers and integrators for other manufacturers, such as this rotary cutting die maker. By equipping its manufacturing systems with the data-driven analytics that will allow its customers to reduce tool wear, scrap, and downtime with predictive maintenance, thereby improving their production yield, profitability and efficiency, the die maker has gained a new competitive edge in support of its sales and business development efforts.

## High-speed in-process defect detection using sigPOD solution

- Reliable quality assurance using digital process signatures
- Enabled continuous monitoring and reporting in production real-time

Contact Sciometric to see how sigPOD could help you improve product quality while saving time and money on your line!

**For more information on sigPOD, visit [www.sigpod.com](http://www.sigpod.com) or email [inquiries@sciometric.com](mailto:inquiries@sciometric.com)**



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AN206 REV1 MAR 2020 - PRINTED IN CANADA