

# Application for Pinch Roller Machine Set-up and Alignment

This brief highlights a method of electronically measuring the real-time force and pressure distribution at the nip of pinch rollers during machine set-up.

The I-Scan system provides the tools necessary to measure, evaluate, view, and balance the forces in a pinch roller nip. Typical objectives in pinch applications are to measure roller contact pressures, to determine roller contact area and nip width, and to balance the forces in the nip along the entire length of the roller(s). The I-Scan sensor (Fig. 1) is easy to insert into the nip and is an ideal tool for an industrial process environment. The system helps companies like 3M, Hewlett-Packard, Canon, DuPont and many others with roller nip force, or pinch measurement analysis.

Measurements were taken from two separate one-foot wide sensors placed in the nip at each end of the same five foot long roller. A similar thickness "shim" was placed in the middle of the rollers, between the two sensors, to compensate for the additional 0.004" (0.1 mm) thickness of the sensors. The two 2-d images shown in (Fig. 4 & 5) use a color coded scale to describe the pressure distribution within a roller nip. The legend (Fig. 3) relates the color scale to the pressure (red indicates higher pressure).

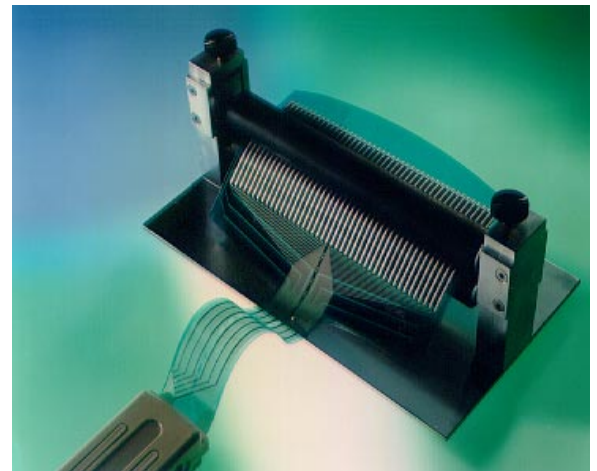


Fig 1. The I-Scan Sensor placed in a test fixture

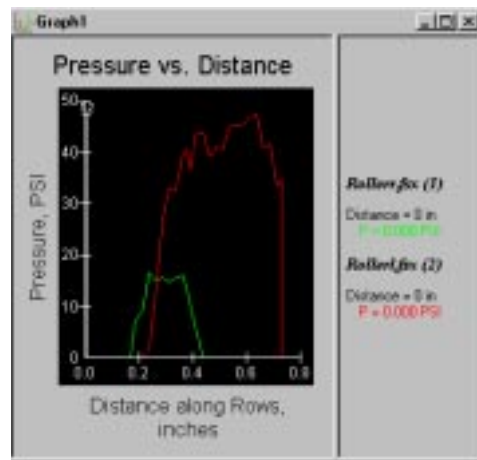


Figure 2

Prior to using the I-Scan system, the roller contact pressure was adjusted by equalizing the oil bearing delivery pressure at hydraulic control units located at each end of the machine. The relationship between oil bearing delivery pressure and roller contact pressure was assumed to be proportional. With I-Scan, this adjustment of the nip is made more quickly and accurately.

Comparing the two images (Fig. 4) and (Fig. 5), it is easy to see how much wider the roller contact area is on Sensor A than on Sensor B. The nip width of Sensor A is 0.60" compared to Sensor B where nip width is 0.35". In (Fig. 2), the red and green traces in the pressure vs. distance graph show the pressure profile across Sensor A and Sensor B.

With the sensors in the nip, and Tekscan's real-time display software, balancing roller pressures can be done quickly, easily and in real-time. An accurate measurement of nip pressure and contact area enables reduction of machine set-up time and minimizes product scrap.

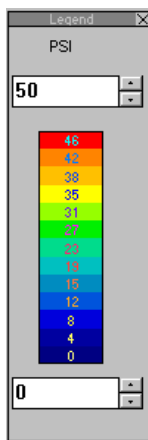


Figure 3

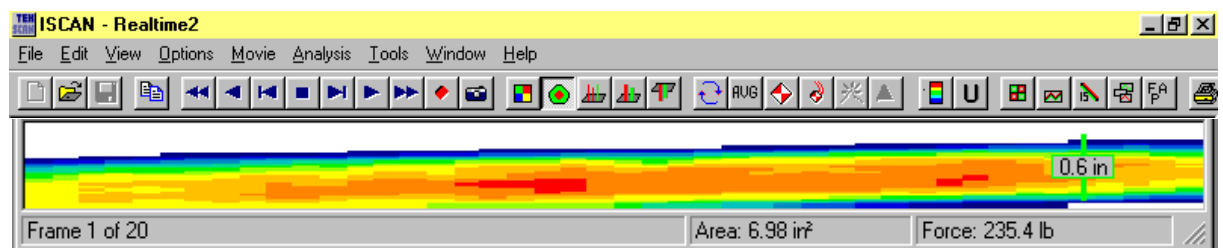


Figure 4/ Sensor A

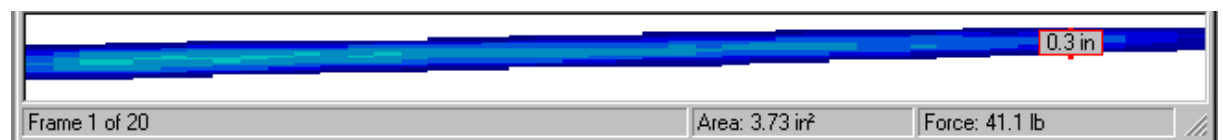


Figure 5/ Sensor B