www.dfe.com controlling process tension

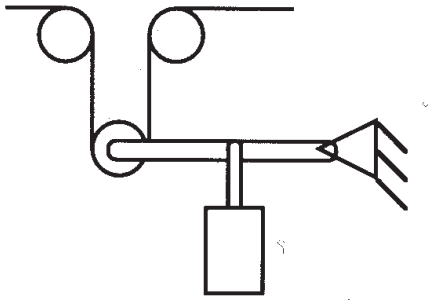
3 APPROACHES TO WEB TENSION MEASUREMENT

There are three predominant tension measurement technologies in use today.

1) **Roll diameter** measurement by **optical** or **ultrasonic sensor**. These sensors measure the change in distance from the fixed sensor head to the roll as it is either building up or winding down. As such, they are not used for intermediate zone applications. Sensor output, usually a 0-to-10 VDC signal, varies as the roll diameter changes at the unwind or rewind station.

The sensor output goes to a tensioning device such as a drive to trim the line speed. This technology may be suitable for non-critical winding applications, but the inferred tension measurement from diameter measurement is less accurate than either of the following technologies.

2) In a **dancer system**, a controller signals the **dancer roll** (a.k.a. dancer arm) to move (vertically or horizontally) back to a start position in response to a significant change in position. The initial positional change is almost directly proportional to the variation in web tension.

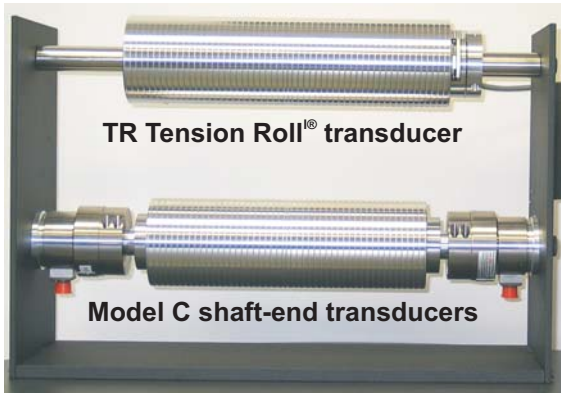


A vertical dancer arm system

The dancer's drawback is that it doesn't measure tension directly.

Were it not for the additional friction, backlash and inertia inherent in the machinery, a dancer system could be as accurate as a direct tension measurement system.

A dancer system allows some forgiveness for web slack by creating web storage in its zone of operation. In an unwind zone a dancer system may help to compensate for out-of-round rolls by supplying web accumulation as needed.



Finally, there are tension transducers (a.k.a. load cells). This direct tension-sensing technology is the most accurate available. Using strain-gage based sensors, tension transducers directly measure the force applied by the web on a selected idler roll. The sensors are calibrated against an electronic readout using a known weight over the tension roll in the web path.

A transducer pair's 0-to-500 mV tension output signal is typically amplified to 0-to-10 V and displayed on a meter readout. To get the desired tension for the job being run, a machine operator may adjust a web tensioning device. Or the transducer signal can be brought to a PLC or automatic tension controller to send a compensated output signal to a drive, clutch or brake.

12/11/2007
892tbThreeApproaches

THE TENSION CONTROL SPECIALISTS
DOVER FLEXO ELECTRONICS, INC.
217 PICKERING ROAD, ROCHESTER, NH 03867 USA • 603-332-6150 • FAX 603-332-3758
E-Mail: info@dfe.com • Internet: www.dfe.com • ISO 9001 Certified