

# UNWIND STAND MAINTENANCE: THE KEY TO FINISHING SUCCESS

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*EXTENDING THE LIFE OF THE UNWIND IS EASY WITH PROPERLY SCHEDULED MAINTENANCE  
AND OPTICAL ALIGNMENT.*

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**T**HE UNWIND, OPERATING 24 HOURS A DAY, 365 DAYS a year, supports several phases in the finishing process including supercalendering, coating, and rewinding paper onto rolls or reels with proper roll structure. During operation, it is subjected to torque-reversing shocks, tension, high speed, and vibration of eccentric rolls, that slowly take their toll. The unwind is crucial to delivering a square sheet under controlled tension to each of these processes; unfortunately, the unwind stand often is neglected until it breaks down or needs replacement.

While component failure and replacement are inevitable, the operating life of the unwind can be lengthened through scheduled maintenance and optical alignment. These procedures assure a higher-quality product with less waste and reduced downtime.

Key areas of concern for unwind maintenance are tension control, clutch backlash, the emergency stop brake, side movement adjustment, and oscillation.

### TENSION CONTROL

The unwind must maintain constant and consistent web tension to ensure smooth production and a top-quality finished product. Poor tension control causes web breaks, limits production speeds, and reduces roll quality.

A computer analysis of unwind tension, provided by a data acquisition specialist, reveals tension variations by plotting both the unwind tension and winder speed, then analyzing how tension behaves during a change in speed. If significant variations in tension exist during any speed shifts, the machine is improperly tuned, used incorrectly or not designed for the current operating conditions.

Tension control and tension levels depend on paper grades and the equipment used. A mechanical brake can only resist the pull of the web. The web actually pulls the unwind and accelerates it. If the acceleration demand exceeds the desired web tension, the brake goes to zero torque output and tension increases out of control. For this reason, most large modern machines now use a

regenerative drive that is capable of motoring, allowing for faster acceleration rates at a smaller degree of variation. High-performance regenerative drives provide control to 1% or better of running tension and can allow accelerations up to 150 ft/min/s.

Maintaining proper tension control also should include:

#### Tuning the drive

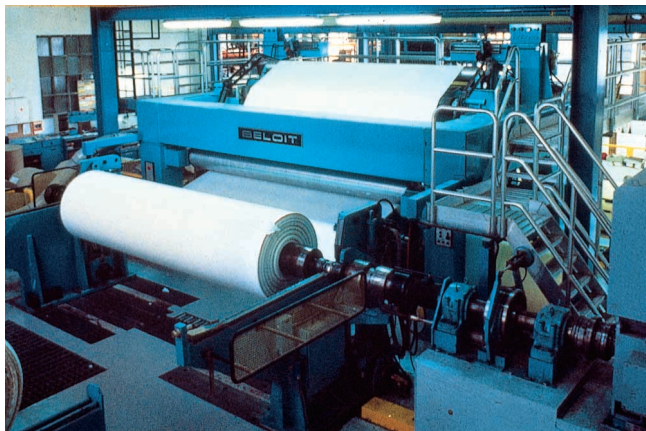
Keep a drive log book. Tuning the drive for all operating conditions, including steady speed, acceleration, deceleration, and large- or small-size reels, is a very complex undertaking. Recording adjustments in a drive log book enables drive technicians to return to a specific setting if conditions have changed. This is even more important when running a wide range of products that require varying operating parameters and need more than one pattern of drive responsiveness for optimal performance.

#### Checking for loose saddles and reels

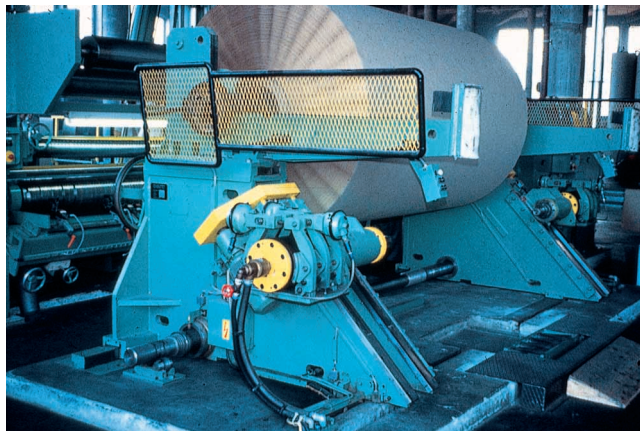
Saddles and spools have an effect on the unwind and the precision with which the tension system and the drive can be calibrated. Periodic but regular inspections will detect if components are worn and need replacing. Worn reel spool bearings will upset tension control to the point of losing web control altogether. It is a good indicator that saddles are worn when reel spools rock and shift in the saddle. This makes tension control difficult with the unwind brake or regenerative drive. For optimum tension control, ensure the reel spool is not bent and is properly aligned.

#### Minimizing clutch backlash

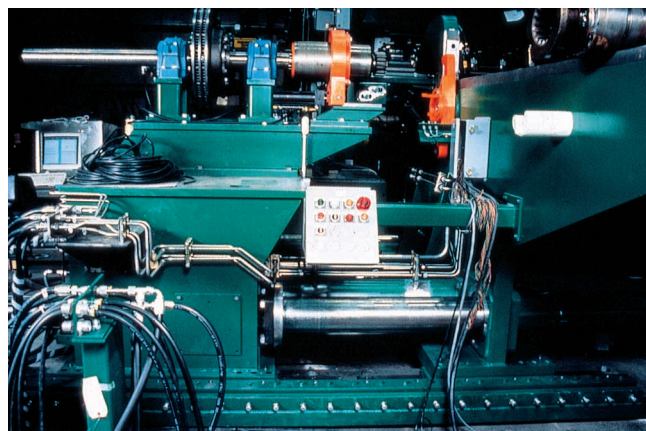
A key maintenance concern that also affects tension control is clutch backlash. Ensuring a properly maintained clutch will discourage backlash and prolong clutch life. Excessive backlash, or the "dead zone" that occurs during a change in speed, quickly erodes the clutch and can produce extreme tension variations, resulting in web breaks.



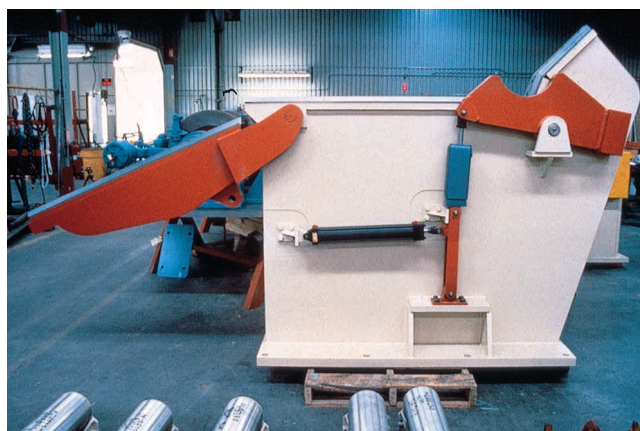
*Scheduled maintenance and optical alignment can lengthen the life of a reel spool unwind.*



*Proper unwind tension is the key to a quality finished product.*



*Keeping a drive log book of all operating conditions and drive adjustments enables operators to return to a specific setting if conditions or operating parameters have changed.*



*Check for loose saddles and reels to ensure precise calibration of the tension system and drive.*

The most common type of clutch resembles a block with a square hole and a matching square coupling. To prevent backlash, the two clutch parts would ideally fit tightly together, but such a close fit is impractical. Some clearance is required for the clutch to be operational. As the gap between the coupling and fitting widens due to wear, backlash increases. Noise generated by a vibrating clutch indicates the clutch is worn, which can cause tension spikes and, ultimately, web breaks.

Eventually, the entire clutch will need to be replaced, but replacing the block and coupling once they start to wear costs less in the long run since waiting only guarantees additional downtime while paper and roll quality suffers.

## EMERGENCY STOP BRAKE

Another key maintenance concern is the emergency stop brake. It must quickly halt the reel following a web break or power failure, to reduce paper loss. Poorly calibrated brake shoes and worn shoe pads reduce the emergency stop brake's effectiveness.

Braking friction wears shoe pads, increasing the clearance, which varies depending on the model. Clearance may range from 1/16 in., the most common, to 1/32 in. A 1/8- to 1/4-in. gap between shoes and the drum will delay the brake's engagement—a problem easily prevented with periodic maintenance checks.

## ALIGNMENT

Even a well-maintained machine cannot deliver quality paper if it is not properly aligned. The moment machinery is aligned, vibration slowly shakes it out of alignment.

In severe cases, vibration can loosen restraining bolts and cause the unwind stand to shift.

In addition to vibration, several incidental factors contribute to misalignment. For example, a forklift may inadvertently bump the unwind stand, or a reel may accidentally hit the unit while being loaded by a crane.

Though most alignment problems cannot be detected by eye, close observation can spot gross web misalignment. If the lead-in roll is in zero position, the web is pulled tight, and diagonal wrinkles emanate from the unwind to the winder, then one of the web carrying rolls or the reel itself may be out of alignment.

Reverse the reel on the unwind to confirm misalignment. If wrinkles appear on the opposite side, it is prob-

ably a paper problem. If the wrinkles remain on the same side, the winder or the unwind, or both, may be misaligned and could require an optical check.

The rewind section should be optically checked for alignment every six months, even if no clues exist to indicate something is wrong. Since after a year some alignment adjustments are always necessary, annual optical checks should be mandatory. **TJ**

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