



# Pulp & Paper Solutions

## IN-SITU BALANCING OF DRYER CYLINDERS



Imbalance in dryer cylinders can result in high vibration throughout the dryer section. As the machine operating speed increases, unbalance forces can increase significantly, leading to reliability and product quality problems. Correcting dryer imbalance presents significant technical challenges, due to slow turning speeds, and phase influence of nearby dryers. Traditional correction methods require extended shutdowns with potential for significant lost production. Acuren's technique has been in use for more than 20 years, using regular maintenance shutdowns as the opportunity for incremental improvement.

### BENEFITS OF CORRECTING DRYER IMBALANCE USING IN-SITU METHOD

- Improve paper machine reliability/availability
- Improve paper machine speed capacity
- Vibration index reduction
- Reduced maintenance costs – fewer breakdowns and sheet breaks
- Reduced energy costs
- Dryer section gears do not typically need to be isolated or removed for in-situ balancing

Acuren has the **expertise and proven competency** to perform in-situ roll balancing saving customers significant time and cost

### WHY IS IMBALANCE DIFFICULT TO ADDRESS USING CONVENTIONAL METHOD

Conventional correction methods require extended shutdowns to isolate each dryer from the geartrain for balancing. Balancing one dryer per shutdown could require many outages to complete. The time frame to achieve a well-balanced dryer section using influence coefficient methods can be cost prohibitive.

The Acuren in-situ approach to correction of dryer unbalance addresses significant technical challenges and constraints, including the following:

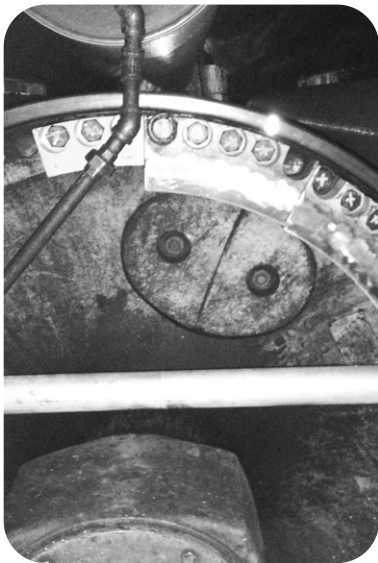
- Limited shut down windows
- Phase influence of nearby dryers
- Slow turning speed
- Predicting trial weights
- Unsteady phase

**A HIGHER LEVEL OF RELIABILITY®**

## THE IN-SITU PROCESS

This method was developed using regular maintenance shutdowns as the opportunity for incremental corrections. It considers the dynamics of the entire dryer section and the influence of all machine components (adjacent dryers, felt rolls, dryer frame, etc.) and eliminates the traditional 'trial run'. One dryer per section is balanced during each run, with trim weight adjustments completed if required. More than one dryer can be balanced during a regular 8-12 hour maintenance window, and the section is quickly returned to service following completion of balance activities (no need to reinstall gears or clothing).

- Vibration and phase of the entire dryer section is recorded using portable instruments – phase and amplitude for tending and drive side of the machine is evaluated and correction weight locations identified
- Identify the target dryer in each section – the “bad actor”
- Detailed analysis of target dryers – determine the dryer influence on adjacent rolls, or vice versa
- Correction Weight - weight is added at locations confirmed during the detailed analysis, typically one target dryer per run up
- Weights are designed to be head mounted on the tending and drive side of the dryers, various types exist. Acuren can provide design and support the manufacture of weights, including estimated sizes and quantities for severity of imbalance and number of dryers.
- Post analysis assessment – following the weight additions, a complete analysis is performed to confirm acceptable amplitude levels have been achieved for the dryer section



## UNI-DRIVE BALANCING

**Acuren can provide a portable drive to rotate the dryer for balancing.**

This method is also performed in-situ, for situations where the mill drive is not available or cannot provide the desired balancing speed. In cases of a uni-run section, the portable drive can be invaluable for balancing. It should be noted that for clusters of geared dryers typically no more than three dryers can be driven together, depending on speed and sizes that number may be lower. For this type of balancing, select gears or clothing may need to be removed.

## EXAMPLES OF IMPROVEMENTS RECORDED

- ✓ Machine speed increases of more than 500 fpm as part of other engineered changes
- ✓ Increased machine speed potential (balancing completed for future planned increases)
- ✓ Vibration index reduction of 58% and more



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