Good Winding Starts – The First Five Seconds – Part 1 Web Handling

David R. Roisum, Ph.D.
Finishing Technologies, Inc.
Neenah, WI 54956 – USA
(+1) 920-312-8466
drroisum@aol.com
roisum.com

EXTENDED ABSTRACT

This paper is paired with one of similar title by Clarence Klassen who discusses the motor control aspects of smoothly starting a winding machine.

The core area is the foundation upon which we will build the rest of the wound roll. The core area is also most important for core supported storage as well as unwinding at your customer. This area must withstand higher pressures and torques without fail. Fail might be to have too much or too little interlayer pressure. Fail might be to allow or even to cause layers to shear that could cause a Type 1 telescope or other problem. This places more demand on the TNT control systems in the first few seconds than at any other time during the winding.

Also important is the dimensional quality and stability of the core. If the core geometry or fit is poor, no amount of winding control prowess will save the roll. If the core geometry changes, such as by crushing or even just shrinking a bit due to fiber cores drying out, no amount of winding control prowess will save the roll. Also, if the core chuck or shaft is loose or not running true, we can have vibration, rough roll edges and other problems. Even attention to all of these core area qualities will do you no good if you allow excessive deflection by choosing core diameters and nipped rollers that are too small for the width. Having a core shaft to support the roll may not be enough here as it too may be flimsy and have poor geometrical quality.

Also note that a perfect mechanical geometry may be ruined by an uneven tail attachment to a core whether done automatically by the winder itself or completely manually by the operator or some combination. Common problems here are a bumpy first layer and a tail that is not taut and square with respect to the core. Here, the first layers will ‘walk’ back and forth giving a rough roll edge. However, nearly every mechanical issue and some control issues will also cause a rough roll edge near the core so that diagnosing the particular root cause can be challenging.

In this talk we will also discuss why tension in particular may be the most important of the TNT’s at the start of winding. This is not only for the reasons given above, but also because nip and torque, when available, tend to be limited at the start. Also, since the first seconds are at a time of acceleration and/or roll change, the risk of tension upsets is higher than almost any other time during winding, putting the roll at even higher risk of offsets due to the tension going low or web damage if it goes high. Finally, we will

discuss the sequencing needed to yield the least tension upsets possible; even before the drive makes its first revolution. The challenge does not end there. Speed changes of any type are most demanding on drive motor control. Clarence Klassen will continue that discussion in more detail next.