

Reel rebuilds and modernizations

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Problem: Depending on the paper grade, 10–18% of a paper machine's total production can be lost due to problems at the reel. Poor reel starts account for about half of these total losses. These poor reel starts are mostly caused by improper and poorly executed turn-ups.

Causes: Inaccuracy in reeling parameters along with discontinuity related to the primary and secondary arms operation lead to puckers or crepe wrinkles. A pucker is a reeling defect where the paper is wrinkled or creped, mostly in the web-edge area. These puckers are usually located in the cross-machine direction or at a 45-degree angle. They are also called "crepe" wrinkles.

If the reel start is made properly, paper layers resist rather large internal nip stresses without being damaged. Internal nip stresses are caused by the paper mass of the machine reel against the machine reel spool. Peak stresses on the edge areas can be evened out by reeling less tightly (especially at the end of reeling where the relative stiffness of the machine reel's paper mass decreases).

The nip between the incoming web and the reel drum sucks in air. This is especially the case at high speeds. Air collects into a pocket in front of the reeling nip. Air bag problems in the machine reel are caused when air gets pumped into the reeling nip between the uppermost machine reel paper layer and the incoming web. The air is prevented from dispersing between the inner machine reel layers because of the tight reeling nip. After collecting sufficient air, the air bags often start moving.

Solution: The paper's air permeability, the reeling nip pressure, and closing of the reeling nip edges (i.e., prevention of side blowing) are all factors relating to air bag prob-

lems. Side blowing is influenced by nip loads, web widths, paper profiles, and operating speeds. Air bag problems, both on the reel drum and in the machine reel, can be solved by means of proper reel drum grooving and roughening, which will eliminate the problems caused by too tight a nip. Properly selected grooving and roughening also have a positive effect on the machine reel structure.

A comprehensive analysis of the machine reels can identify problem causes and suggest solutions. It may be necessary to rebuild the reel. Examples of successful reel rebuilds include:

- Replacement and modernization of primary arms
- Replacement and modernization of secondary arms
- New reel controls or tuning of existing control parameters
- Replacement of mechanical doctors with air doctors
- Push-button tail threading implementation
- Complete reel automation
- Reel drum replacement
- Grooving or friction-coating of existing reel drum
- Replace pneumatic reel controls with hydraulic controls. 

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