

The information and data contained in this document were prepared by a technical committee of the Association. The committee and the Association assume no liability or responsibility in connection with the use of such information or data, including but not limited to any liability under patent, copyright, or trade secret laws. The user is responsible for determining that this document is the most recent edition published.

## Press fabric guiding

### Scope

This technical information paper covers the principles of press fabric guiding. In addition, it provides general rules for preventing or inducing trade line distortion. A table on troubleshooting press fabric guiding problems is also included.

### Definitions

1. *Press fabric or press felt*: Any fabric used in the mechanical removal of water by a paper machine press nip.
2. *Position*: Usually refers to the fabric's location on the paper machine; for example, first press bottom fabric or third press top fabric. Sometimes used in a different sense (for example, see definition of *guide palm* below), this may refer to the fabric's attitude or alignment on the machine.
3. *Trademark line, trade line or guide line*: Refers to the full-width cross-directional line (usually just one line, sometimes two) that fabric suppliers put on their fabrics. The trademark line is useful for identifying problems with fabric guiding on the paper machine. Typically, the color or pattern of the line reflects the supplier's trademark, hence the term *trademark line*.
4. *Guide roll*: A roll that is pivoted on one end (typically the back side) and movable on the other (typically the front side) for the purpose of controlling fabric tracking. The guide roll position is normally adjusted in response to the changing position of a guide palm that rides on the edge of the fabric.
5. *Guide palm or guide paddle*: A device that rides on the edge of the fabric, sensing fabric position, and automatically controlling the movement of the guide roll in order to keep the fabric tracking straight.
6. *Crowned roll or convex roll*: A roll of non-uniform diameter across the width of the roll, with a larger diameter center and tapered diameter toward the ends.
7. *Negative crowned roll or concave roll*: A roll of non-uniform diameter, with a larger diameter toward the ends and smaller in diameter at the center (opposite of a crowned roll).
8. *Deflected roll or flexed roll*: A roll of uniform diameter across its width that runs with its axis curved in response to fabric tension and gravity.
9. *Bowed roll*: A flexible roll of uniform diameter that is mounted on a curved central shaft, resulting in a bow in the roll face. A bowed roll may have fixed or variable dimension (arc). It is typically used to smooth out wrinkles by inducing a spreading or widening action on a moving fabric (or paper web), but may also cause stretching or distortion if the setup is improper.
10. *Stretch roll*: A roll which is adjustable in such a way as to increase or decrease the fabric loop length in order to maintain the desired level of tension (tightness) on the press fabric. The stretch roll may also serve as the lead-in or lead-out roll in relation to the guide roll.
11. *Wormed roll*: A roll which has surface ridges spiraled about its circumference, usually emanating outward from the middle of the roll towards the ends. A wormed roll is typically used to produce a working action on the fabric which helps to keep it open, and may also reduce the tendency of some fabrics to wrinkle over long unsupported distances (draws). It is imperative that the wormed roll be positioned end to end so that spiral moves from the middle to the edges with the normal roll rotation.

TIP Category: Automatically Periodically Reviewed (Five-year review)

## Safety precautions

The adjustments and modifications to paper machines and related equipment described in this TIP should only be performed by properly trained and authorized mill personnel and in strict compliance with all mill safety and machine operating guidelines as well as all lockout/tag out procedures as they apply.

When working around press fabrics, particular attention should be given to hazardous chemical showers often applied in a batch mode. Caution should be exercised near high temperature water showers, high pressure felt showers or edge deckle showers and the possible use of steam showers over uhle boxes. An additional hazard might be the whipping of “strings” on the edges of the fabric.

The press section has many roll nips at press rolls and also on the ingoing side wherever the felt contacts a roll. Never reach into nip points. Observe all posted signs and keep all guard rails and nip guards in position when the press is running or crawling. Contact process owners if any guards are incorrectly positioned, damaged or removed.

## General guiding principles

A typical guiding system (Fig. 1) consists of a guide palm mechanism to detect fabric position, along with an actuator mechanism that adjusts the movable end of a guide roll ahead or back in order to correct the fabric position. The guide roll actuator may be either a mechanical screw-type, hydraulic, or air bellows system. On some machines, the guide palm is replaced by an optical non-contact fabric edge tracking device.

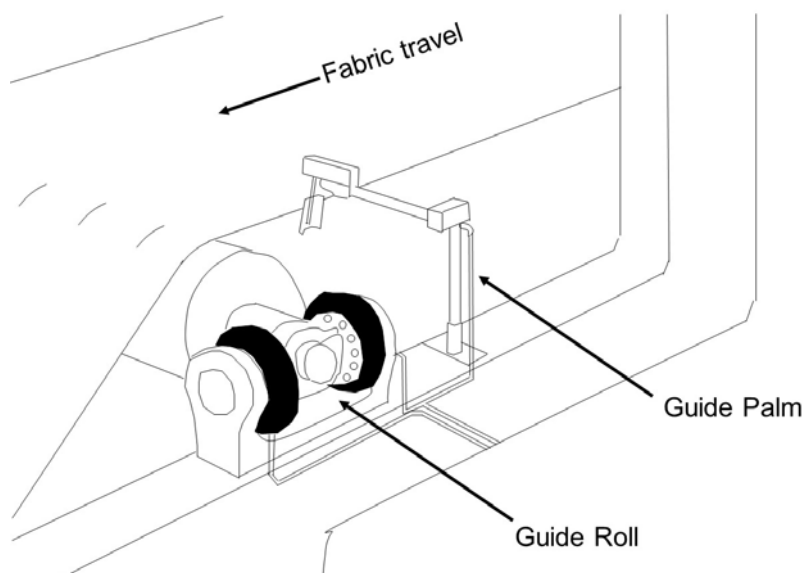


**Fig. 1.** Typical guiding system

The guiding system operates continuously while the machine is running to keep the fabric tracking in proper alignment, centered on the machine and prevent it from running off to one side.

It is the friction and pressure created by fabric tension and by wrapping the fabric partially over the guide roll that allows the guide roll to guide the fabric.

A fabric in contact with a rotating roll will generally move in a direction that is at right angles to the roll. When roll alignment is not perfectly perpendicular to the fabric run, the fabric will line up at right angles to the surface it touches first. In other words, a guide roll angled or pivoted with the run of the fabric, will cause the fabric to move in the direction of the roll side that it contacts first (Fig. 2).

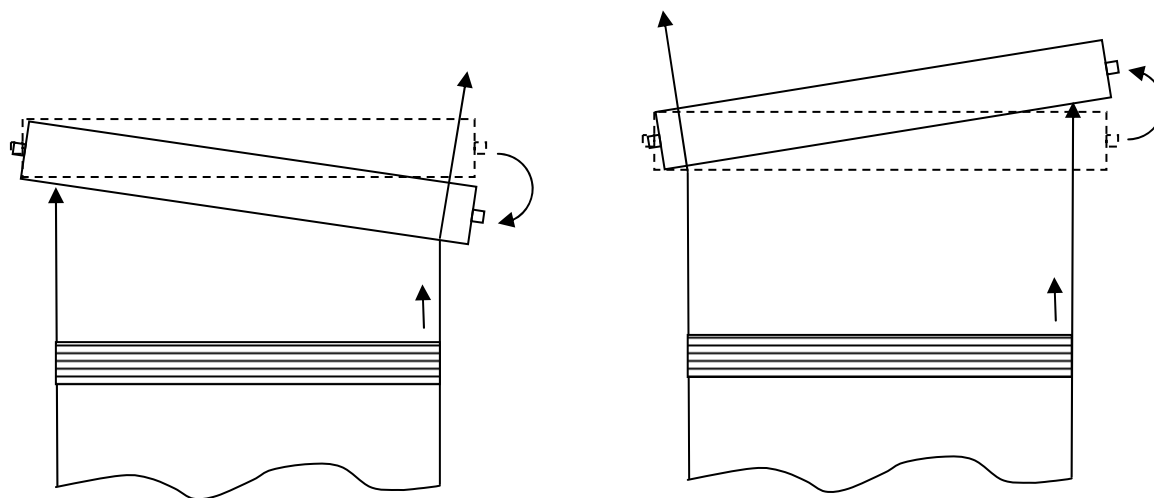


**Fig. 2.** Effect of cocking the guide roll

The angle of fabric wrap on the guide roll is probably the most important factor in guiding. The speed with which a fabric responds to movement of the guide is determined by this angle. A normal guide roll wrap is  $25^{\circ}$  to  $35^{\circ}$ . This fabric wrap will lead to smooth, positive guiding action. Angles less than recommended could result in poor fabric response to the guide roll movements. Angles greater than recommended could cause a distance effect (explained later) and skew the fabric, or cause excessively rapid response or oscillation, especially on short fabric runs.

Positioning the guide roll in the fabric run, relative to other rolls, is also an important factor in its effectiveness. To ensure effective response to the guide roll, the distance from the lead-in roll to the guide roll should be approximately twice that from the guide roll to the lead-out roll. The fixed lead-out roll also needs to be relatively close (but not less than  $1/3$  of fabric width) to the guide roll, with at least  $25^{\circ}$  wrap for best performance, so that the fabric contacts this roll and sets the movement while still in its guided position. The recommended roll configuration is illustrated in Fig. 3.

Proper fabric tension is also required for effective guiding because insufficient tension may allow slippage between the fabric and roll surface, causing sluggish response, while excessive tension may cause trade line distortion due to deflection of the rolls.

If a fabric consistently tracks to one side, it is usually the result of a misaligned roll somewhere in the fabric loop, especially a roll with a high angle of wrap. This can occur with any roll, but skewing is most often caused by misalignment of the stretch roll, almost inherent due to its independent adjustment on each side of the “jack.” In this case, the large degree of wrap at the stretch roll may also lead to skewing of the trade line because of the distance effect that is created.

### Fabric or trade line distortion

Papermakers' press fabrics are designed to run with a straight guide line, having the line perpendicular to the running direction. However, due to imperfections in the press arrangement or other factors, this is not always the case in actual operation. A line that is bowed or skewed (Fig. 4) indicates distortion of the base fabric weave that generally has negative or undesirable effects on press fabric properties and performance. A small amount of trade