Measuring Roll Parallelism in the Laminating/Coating Industry using inertial alignment equipment.

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Introduction

Lamination of documents is better described as the encapsulating the document by bonding either side with a clear plastic film making them waterproof and tear-proof. Even all forms of digital inkjet printing technology need either a film or liquid laminate for protection.

Coating on the other hand is a process of applying a coating or print to one or both sides of a continuous web substrate, such as roll or fabric for example. The coating is or printing is done sometimes for functional purposes and at other times, for decorative needs.

Coating and Laminating have crossed bridges across virtually every product group in the textile industry, including composites, where its potential is especially wide.

The main interest in this paper focuses more on the lamination and coating involved in industries such as a film, packaging, adhesives, aluminum etc.

Older production lines run much faster today than they once did. At the same time, the thickness e.g. of aluminum foil for the liquid beverage production has decreased steadily, in order to save costs for raw material. Therefore the repeated inspection of the alignment of rollers is a must not only in certain parts of the lamination and coating process but across the entire machines.

Advantages of Lamination/Coating

1) Preservation
2) Enhancement of physical properties
3) Long term protection from frequent handling, temperature etc.
4) Durability
Example of a Coating Laminating Machine

Picture 1: Overview picture of a laminating/coating machine.

Picture 2: Schematic of an inline laminator/coating.
Preventative Maintenance

Alignment is one of the main causes for inferior product quality which leads to many of the following common problems:

- Roll Wear
- Unwanted downtime
- Scrap and its related costs
- Labor
- Wrinkles
- Bubbles
- Weak Bond
- Steering Trouble

Fast Approach - Inertial Measurement

Alignment has always been measured traditionally using some sort of optical instrument. These instruments or techniques depend on line of sight and the center base line (offset line) on the floor to check the square and level of the rolls in the machines. Such instruments also measure one plane at a time.

As shown above, there can be up more than a 100 rolls in machines (also on several floors) depending on the material produced and to measure each roll traditionally to ensure proper alignment takes hours to complete.

Inertial technology is not restricted by any optical means. With the use of 3 ring laser gyroscopes the user is able to sweep the device over the roll (minimum of 20 degrees) and be able to project the roll’s position in space.
The results show the rolls in a 2-D format. The green represents the operator end and the red represents the drive end of the roll. The rolls present the offset in comparison to the reference roll as shown in the picture.

This is a new innovative method to see the map of the whole machine within hours compared to other methods available.