Alignment of Cylinders with Space Technology

The alignment of rolls and cylinders plays a bigger role in the quality of the end product and even in the whole production line than is often thought.

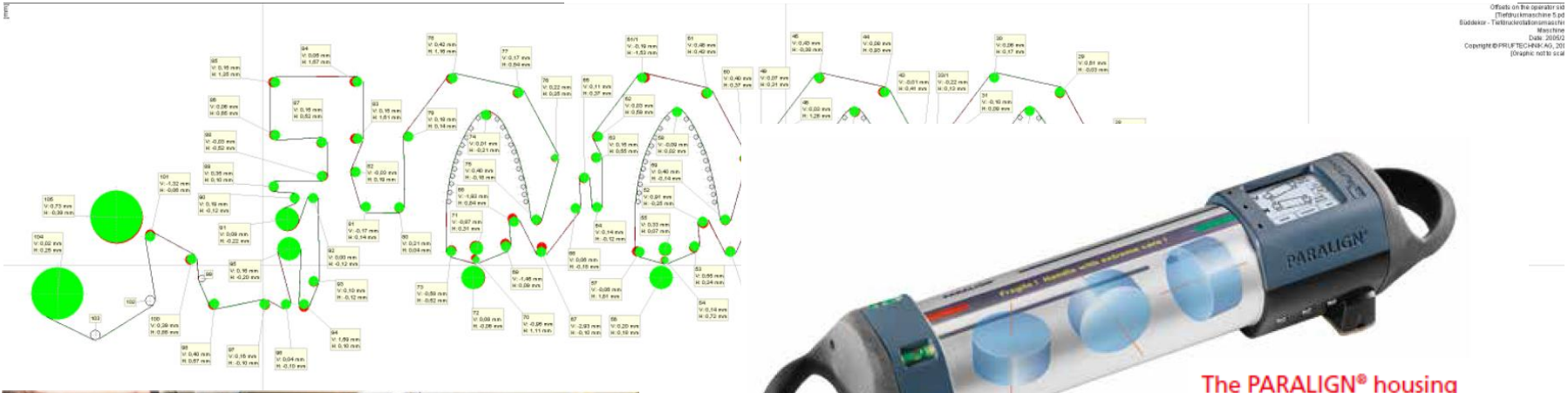

Table 1: The alignment results of the cylinders.

Figure 3: The PARALIGN® housing contains three highly precise ringlaser gyroscopes

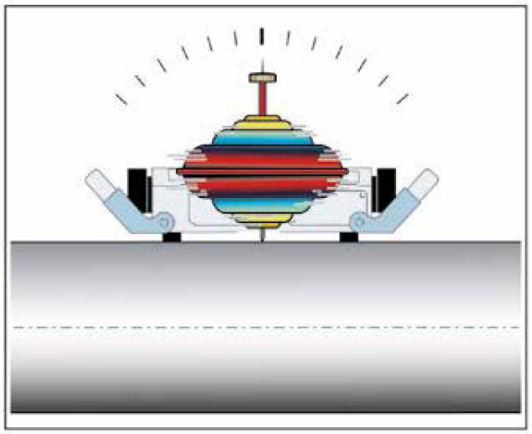

Figure 4: Gyroscopic principle.

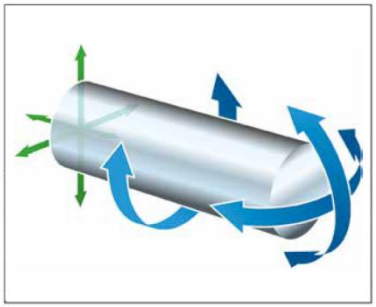

Figure 5: Measurement directions (Roll, Pitch, Yaw), where-from the cylinder alignment is calculated.

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Increasing efficiency of web handling production in the packaging industry

... save costs and reduce environmental footprint

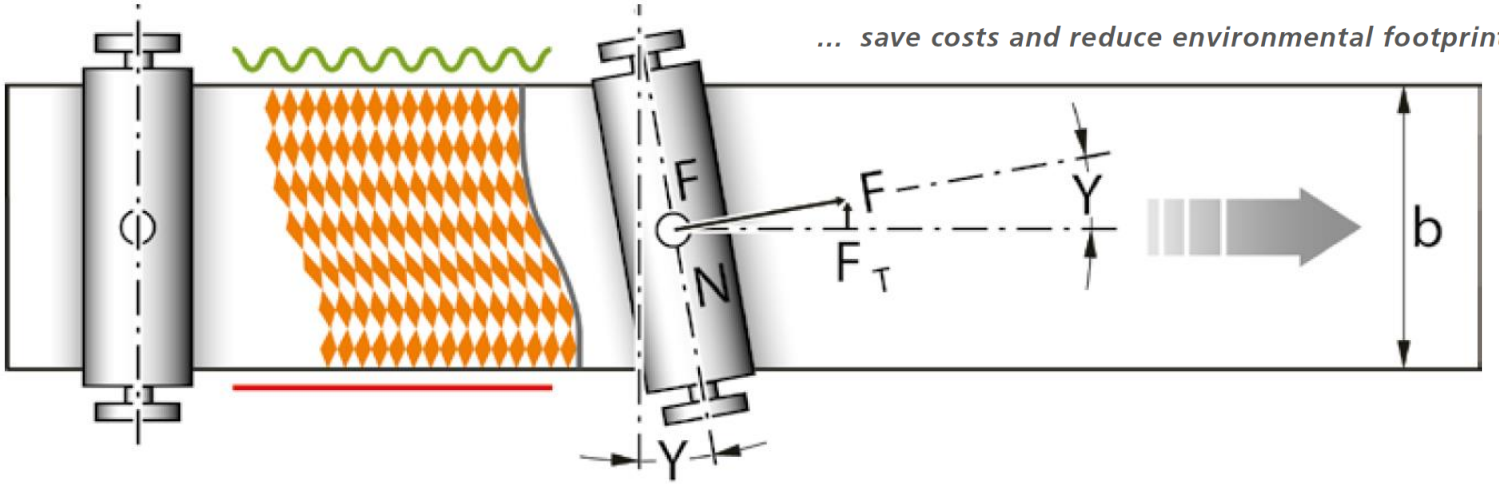
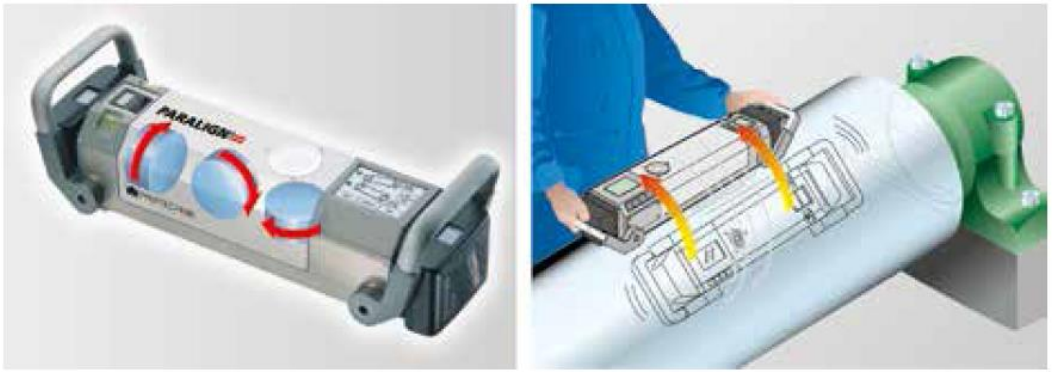


Figure 2: Schematic depiction of the distribution of forces on the web in the case of a misaligned roll in the production process. The transverse force FT produces the rhombus-shaped deformation of the material, as seen in Figure 1 on the right. This deformation invariably results in folds. Another result is an over-extended side, as shown by the red and green lines. Although this longer side does not directly affect the production process, it does cause problems in subsequent production steps, e.g. in the printing of the package. If the aforementioned effects occur on a production line, it must be checked urgently for roll parallelism.



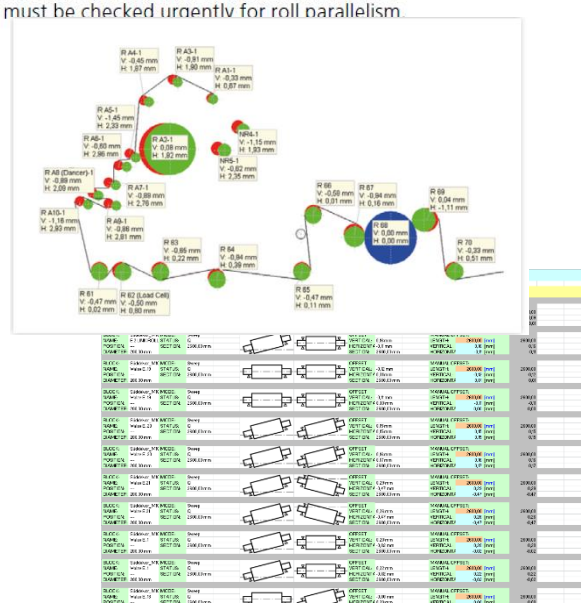


Figure 3: The illustration on the left shows the PARALIGN® measuring device, with the ring laser gyroscopes in blue. Each gyroscope measures the angle around the axis of rotation shown in red. As opposed to conventional methods, line of sight from outside of the machine to the rolls is not necessary. The illustration on the right shows the use of the measuring device on a roll. The measuring device is placed on the surface of the roll and then moved across while the measurements are taken.

Geometrical Plant Alignment using Modern Measurement Technology

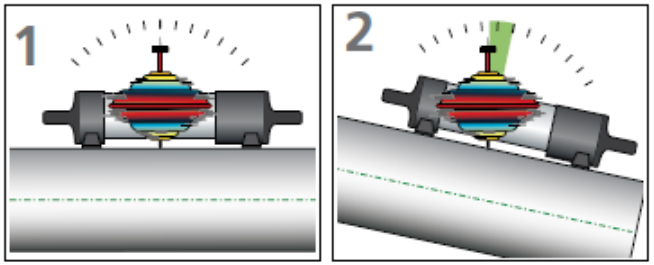
An increase in production speed in web-conveying plants while complying with the quality requirements requires the precise geometrical alignment of the plant.

Parallelism of the rolls among one another is as important as perpendicularity of all rolls to the reference axis of the machine. Modern measuring methods for geometrical plant alignment are explained in the following.

A real-life example

The wire rolls of a post-drying group were replaced. The PARALIGN® service offered by PRÜFTECHNIK was used for verifying roll parallelism. The newly installed rolls were measured, aligned, and their alignment state documented within a few hours. Figure 4 presents the measurement results before and after alignment.

The observer is positioned on the operator's side of the machine, represented by green dots. The red dots represent the machine side of the roll; the blue dot is the selected reference roll that is perpendicular to the drawing plane.



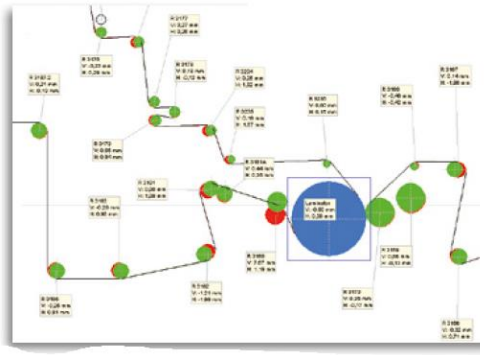
Why can we not use a theodolite?

As in this case – as so often – this is not possible. Just as modern tracking interferometers and electronic tachymeters, theodolites are optical measuring systems that require a visual connection to the rolls.

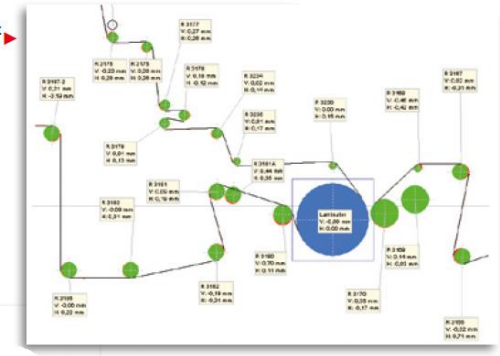
This results in enormous restrictions. The time effort should not be underestimated either: A trained optical engineer can measure 6 to 8 rolls a day using a theodolite. PARALIGN®, on the other hand, can completely document up to 3 drying groups within a day (see figure 5).

The time for roll corrections during this service appointment was also used to document the alignment state of further drying groups. The qualitative result is presented in the following figure.

Before alignment



After alignment



Roll face length: 2000 mm
Your point of view is the operator side of the machine, represented in green. The machine side is represented in red. The blue marked laminator is chosen as reference roll, it is perpendicular to the drawing.

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