

Measure parallelism of rollers in a galvanizing line

Patented PARALIGN® offers unmatched speed, simplicity & measurement reliability

We used PARALIGN® to measure a galvanizing line for sheet metal. The galvanizing line consists of an acid bath, an annealing furnace and the galvanizing line itself. It is used for processing sheet steel rolled to a thickness of 0.06 inches. The production speed of the line is approximately 200 feet per minute.

Unplanned standstill every 20 hours

Part of the motivation for this PARALIGN® measurement was that this plant prompted an unplanned standstill once every 20 hours on average, while the average time between unplanned standstill for comparable plants in the same group of companies was approximately 60 hours.

PARALIGN® was used to survey the area from the reel to the annealing furnace. The following cylinders were measured (see fig. 1):

During measurement, a narrow strip of the tape to be galvanized was left in the machine, to facilitate reeling in when resuming production. For the

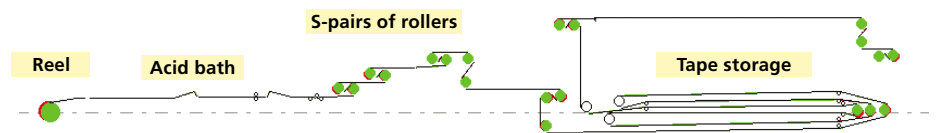


Figure 1: Overview of the galvanization facility from the reel to just short of the annealing furnace. At the time of measurement the two tape control units were in the most recent operating position and therefore deviate significantly.



Figure 3: S-Pair of rollers (arrows), one roller in two is encased. An S-pair of rollers is used for pulling the tape through the facility (cf. Figure 4)

storage. An S-pair of rollers should be parallel in itself as during operation both rolls are mostly wrapped in the tape of sheet metal. This applies to the pairs of rollers found in this machine, except for steering rolls 7 and 8, which have a horizontal offset of about 0.08 inches (2 mm) relative to each other.

During operation, the offset between adjacent S-pairs of rollers should be minimal since the high degree of wrapping leads to a huge lateral force even at small offsets, which will significantly impair the quality of the processed material. The protocol shows that the pair of rolls 9 and 10 has an offset of approximately 0.03 inches (0.8 mm) relative to the pair of rolls 5 and 6.

Summary

The PARALIGN® measurement allowed to gain significant insight into the complete galvanizing line. Optical means of measurement have been im-

PARALIGN® measurement the tape was moved to the edge of the rollers in order to allow measuring in the center of the rolls (Figure 2). The customer took care of these tasks before the start of the actual measurement.

The rollers are mostly cylindrical. However, most are characterized by run-in marks and traces of cinder and rust, leaving the rollers' surfaces less than perfectly cylindrical at the rims. Wherever this prevented measuring the rollers in the center they were instead measured on the side and the means of the results was taken.

4 hours measurement time

Figure 5 shows the alignment situation of the rollers preceding the tape

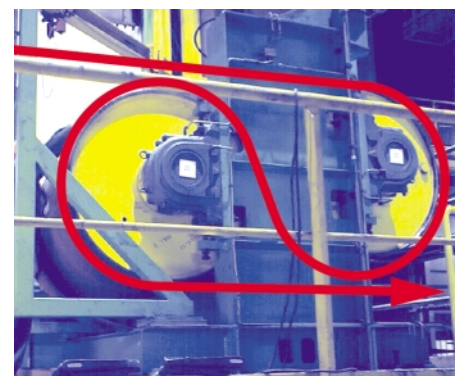


Figure 4: S-Pair of rollers. During production the tape is wrapped around the major part of the rollers to enable the required traction on the tape.



Figure 2: Measuring a roller with PARALIGN®

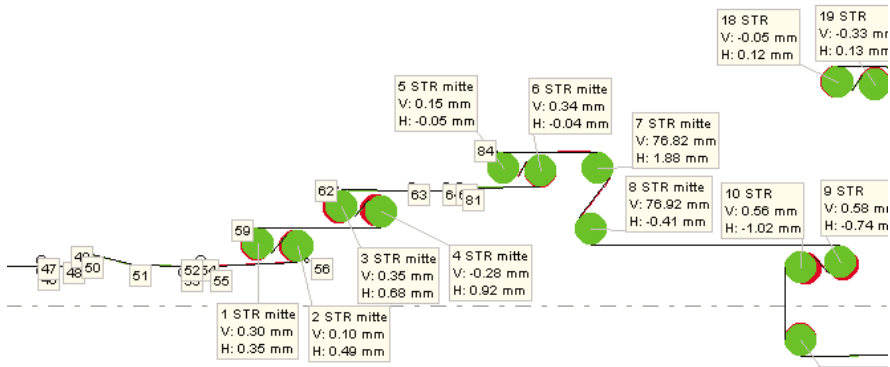


Figure 5: Alignment situation of the S-pair of rollers preceding the tape storage. The vertical offset observed on rollers 7 and 8 is not critical, unlike the uneven horizontal offset!

possible for large parts of the facility as most areas are encased, with no visibility between rollers.

The measurement time required with PARALIGN® was approximately four hours. To facilitate this speedy measurement, the customer had provided the measurement team with a sketch of the facility in advance and had attached number labels on the rollers and built scaffolding on the facility in order to ensure safe and convenient access.

Outlook

The annealing furnace and the tandem mill, being the production steps downstream of the galvanization process, can be documented with PARALIGN® in a similar way. The same applies to the hot-rolling mill supplying the ingoing material. The hot-rolling mill should be an especially interesting object to measure as faults in the ingoing material may lead to systematic run-ins of the tape of sheet metal.