

**New development** Numerous benefits for cold rolling mills  
**Contactless online detection of residual oil on the strip**

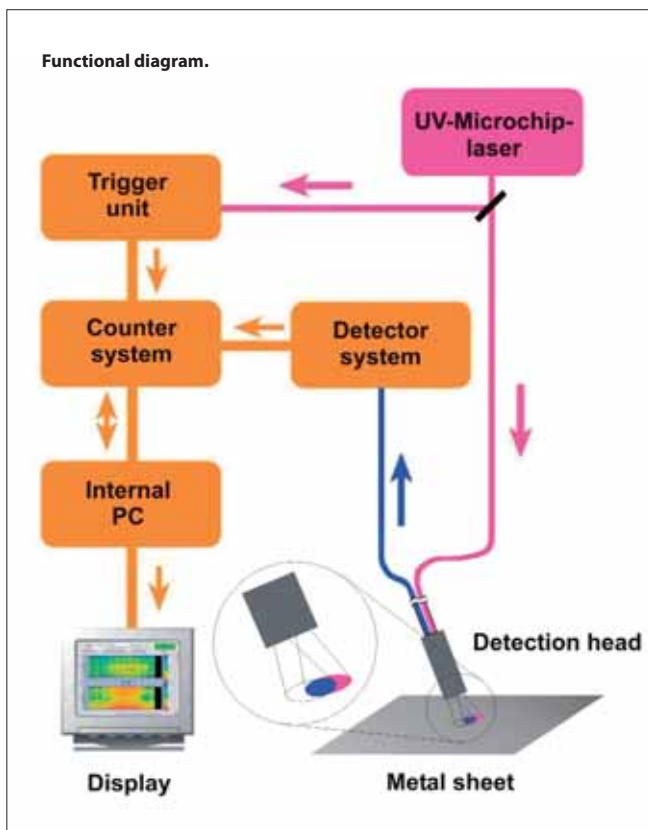
Quick, precise and continuous detection and recording of even the smallest amounts of residual oil on cold-rolled strip today are mandatory for quality assurance and avoidance of scrap due to corrosion.

Therefore, we teamed up with Systekum to jointly optimize the company's online measuring system for use in our cold rolling mills. The result is a measuring system which meets all the demands made on contactless measurement at high strip speeds and with high accuracy during cold rolling and skin-passing. Marketing of the online measuring system for this field of application is done by SMS Siemag.

**Where does residual oil on the strip come from?**

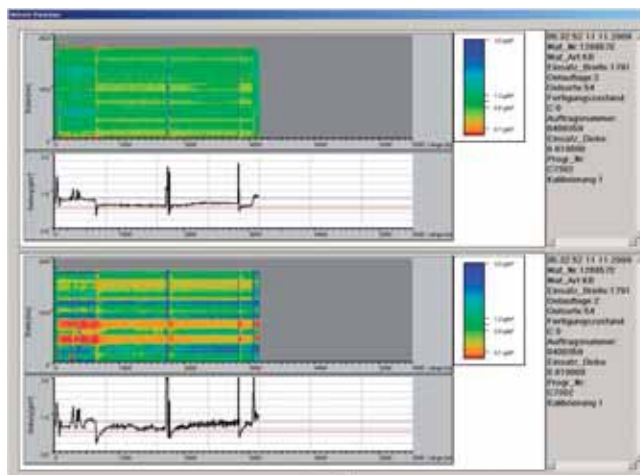
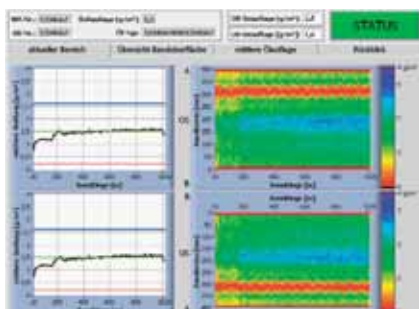
The cold rolling and skin-passing processes require cooling and lubricating media. The cooling lubricant serves different purposes: on the one hand, it reduces friction between strip and work rolls with longer service lives of work, intermediate and backup rolls for consequence. On the other hand, it cools both the strip and the rolls. Plus, cooling lubricant ensures a constantly high surface quality of the rolled or skin-passed strip.

Due to the nature of the process, it cannot always be prevented that oils are left on the strip after rolling. As a rule, these residual oils consist not only of cooling lubricants but also of tramp oils such as hydraulic oil, bearing oil, and grease. To prevent problems in downstream processing equipment, for instance corrosion or "cracking" in the bell-type annealing facility, the amounts of residual oils on the strips should be monitored and minimized.



Measuring system to detect residual oil on strips.

**Documentation  
of residual oil.**



**Measuring method**

The measuring procedure is based on the time-integrated laser-induced fluorescence spectroscopy, LIF(t) for short. Via quartz fibers, the adapted wavelength of the light source causes the rolling oil to be measured to fluoresce. Another fiber-optic conductor transmits this fluorescence to a highly sensitive detector which transforms it into electrical signals. Based on a calibration, this information is converted into the desired measured value.

**Design and functions.** The graph on the left reflects the functional principle. Signal output takes place in any desired formats. The measuring instrument consists of a detection head, fiber-optics and an analyzing unit, the Kontavisor (photo on the left). All components are designed for use under rough rolling conditions. The measuring unit has one detection head each on the strip surface and underside. The detection heads move across the strip width, see illustration on the right. The two diagrams above are typical representations of residual oil over the strip width and length, as used for documentation. Developed by Systektum, the basic measuring system was optimized for use in cold rolling mills, skin-passing mills and strip processing lines in close cooperation with SMS Siemag.

**Numerous benefits.** In practical use, our online measuring system offers a whole range of benefits:

- It permits continuous detection and documentation of residual oil over the width and length of the strips.
- It reduces scrap due to corrosion through quick detection of excessive amounts of residual oil.
- It optimizes the consumption of lubricants.
- Suitable additional measures permit to detect increased amounts of tramp oil resulting, for instance, from leakage in the hydraulic system.
- Thanks to its small overall dimensions, it is excellently suited for subsequent installation in existing mills.

Furthermore, the system is employed for measuring defined layers of anti-corrosion oils, varnishes or paints, anti-fingerprint coatings and other oils on strips.



**Traversing  
system with  
detection heads.**