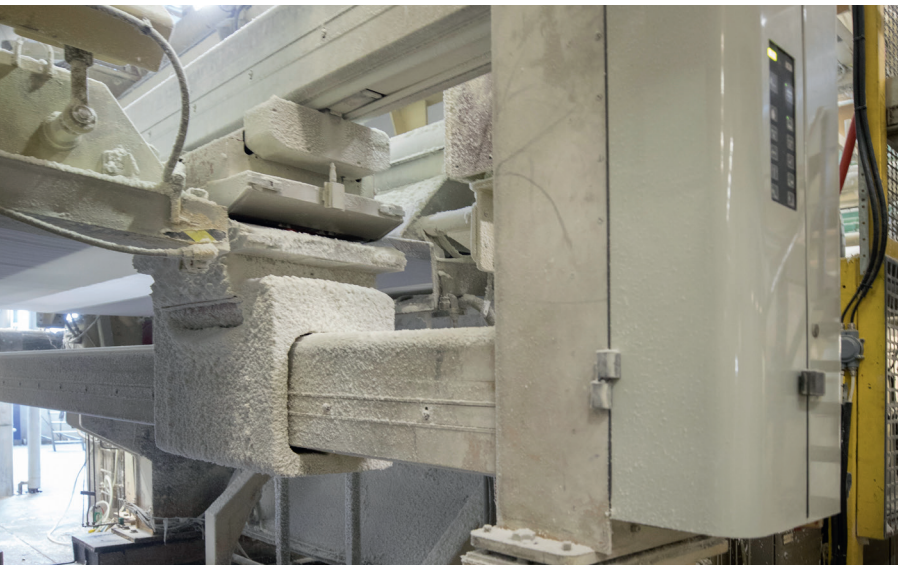
PULP AND PAPER | ESSITY IN LILLA EDET | SUCCESS STORY

Changing to infrared technology provides numerous advantages for tissue paper mill



Essity tissue paper mill (formerly SCA Hygiene Products) in Lilla Edet, Sweden, had planned for an upgrade to the latest technology on their PM8 measurement scanner, Network Platform. This upgrade also extended the life of the measurement scanner at another of the mill's paper machines. This was possible thanks to an IR-solution for measuring moisture and weight along the paper web – ABB's High Performance Infrared Weight and Moisture Sensor (HPIR-FW).

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In order to guarantee that all paper properties exactly meet specifications, continuous measurements of moisture and fiber weight is performed at Essity.

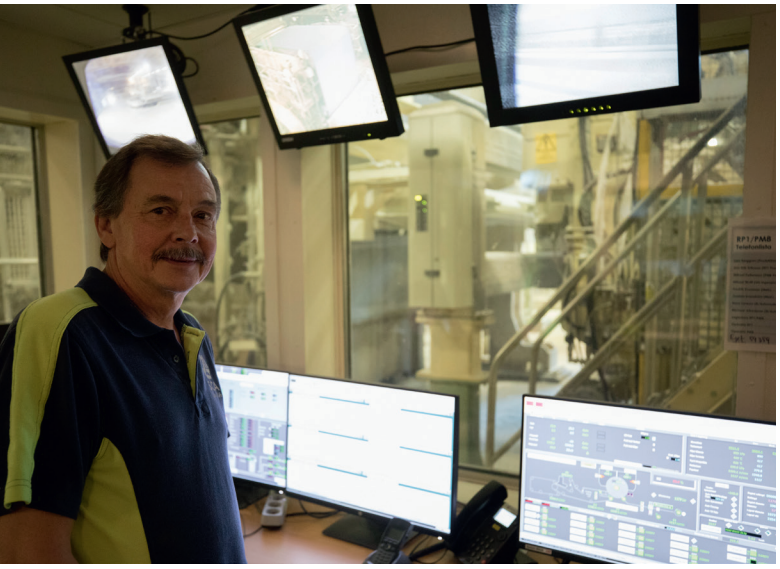
Every year, Essity in Lilla Edet produces about 100,000 tonnes of toilet paper and paper towels in the category "Away From Home". In order to guarantee that all paper properties exactly meet specifications, moisture and fiber weight of the paper produced are continuously measured.

The measurements are done both manually, four times per shift, by the machine operator who is evaluating the paper samples in the mill's own laboratory, and automatically online by measurement scanners mounted on the paper machines. In each scanner, there are measurement sensors that report some 600 measurement points each time the paper web is traversed, which gives the operator continuous control of the required properties for the manufactured paper.

"Given that PM8 produces paper at 1800 meters/min that keeps the width of almost 4 meters, a deviation between the planned weight and the actual output of only 0.1 g/m^2 can be very significant both in terms of fiber usage as well as paper quality", says Mikael Pettersson, Process Engineer at Essity, Lilla Edet. "In the end, these deviations can adversely affect economy and profitability".

PM8 is one of three paper machines at the mill, and each machine is equipped with an ABB scanner. The equipment was installed in the 1990s and has worked very well; however, the promethium that was standard is the sensors of that era is a mildly radioactive material. Its performance degrades over time, and it also presents other challenges.

"Having a source of radiation in the premises is of course a disadvantage. We must follow various safety regulations in terms of handling and storage, such as having a radiation protection officer, report to the Radiation Protection Authority, and further the radiation source brings extra costs for both handling and disposal. Getting rid of the sources of radiation is of great benefits to us, not at least, in terms of the work environment. Earlier, I used to work with maintenance of the sensors, and it never felt good to dismantle the equipment knowing that it keeps a source of radiation inside," says Mikael Pettersson.



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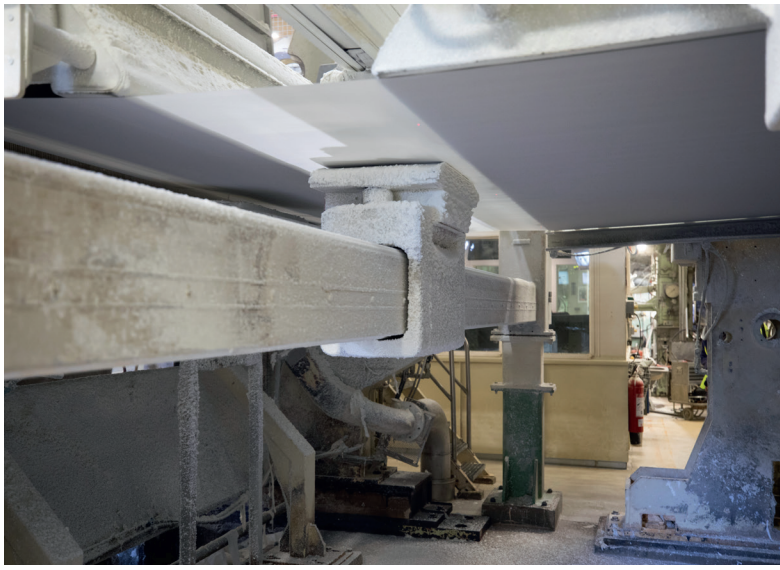
“We have the same reliability as before, and we can continue working as usual, and without the extra work that a source of radiation brings”, says Mikael Pettersson, Process Engineer at Essity, Lilla Edet.



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To evaluate the technology, the new sensor was compared to the one in place for a three-month period, a trial that confirmed to a 100 percent the reliability of the new sensor.

Replace, re-use and remove

In addition, promethium, like all radioactive material, has a half-life meaning that gradually the intensity decreases and finally it will not work well enough for the measurements, and needs to be replaced. In 2015, this was the case on one of the paper machines at Lilla Edet, at the same time as the preparations for the technical upgrade of the PM8’s measurement scanner. Hans Stenberg, ABB’s customer account manager for Lilla Edet, then proposed that Lilla Edet install ABB’s new infra-red-based (IR) sensor HPIR-FW on PM8, and then move that machine’s existing sensor, which was newer, to the machine with the oldest sensor.

This simple solution had several advantages – two sensors could be replaced by one; one source of radiation would be eliminated through the introduction of infrared technology while the other machine would have an upgraded scanner.

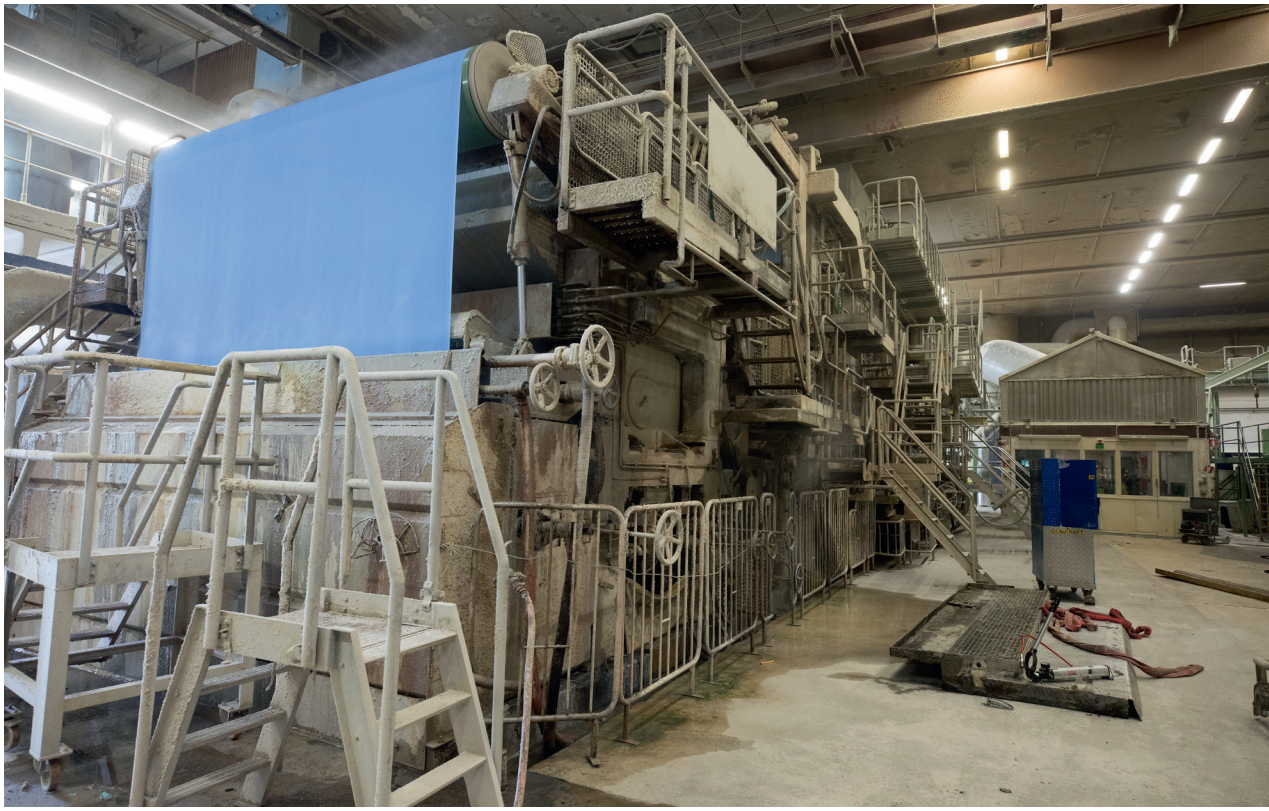
Prior to upgrading the PM8 measurement scanner, the measurement head contained one moisture sensor and one weight sensor for reporting both moisture content and fiber weight. The new IR-sensor, HPIR-FW, replaces both sensors, as it is a combined sensor measuring both moisture content and fiber weight at the same time. The sensor is compatible with ABB’s latest technology, Network Platform, and does not require anything else than the already planned upgrade of the electronics to the existing measurement scanner. Neither the measurement scanner nor the measurement head needs to be replaced, which saves both time, resources and the environment.

Could it work?
Nevertheless, the technology of infrared-based fiber weight measurement is relatively new, which made operators at the tissue paper mill somewhat doubtful about the proposal. Could it work? Would the measurements and results be as accurate as they needed? “As we are dependent on extreme measurement accuracy, it’s obvious that we are skeptical when presented with new measurement methods, and don’t accept them right away, without some assurance that they work first,” says Mikael Pettersson.

Hans Stenberg understood the doubts and added another suggestion: instead of replacing the promethium-based sensor immediately, during a test period, the new IR sensor could be installed in parallel with the old weight sensor. In that way, Lilla Edet could compare the results and evaluate the accuracy of the new IR sensor without risking the quality of their products. This was a solution that Mikael Pettersson and his colleagues found to be very good.

In December 2015, at a scheduled maintenance stop and the upgrade of the PM8’s measurement scanner, the new sensor was installed in the measurement head, along with the old weight sensor. The two sensors worked in parallel for three months, and the evaluation of the measurement results showed that the reliability of the new sensor was at least as good as the old one. Hence, after the test period, the old sensor was removed from PM8’s older measurement scanner and instead installed in the scanner with the expiring radiation source on the other paper machine.

Mikael Pettersson is very pleased with the solution. “We have the same reliability as before, and we can continue working as usual, and without the extra work that a source of radiation brings.”



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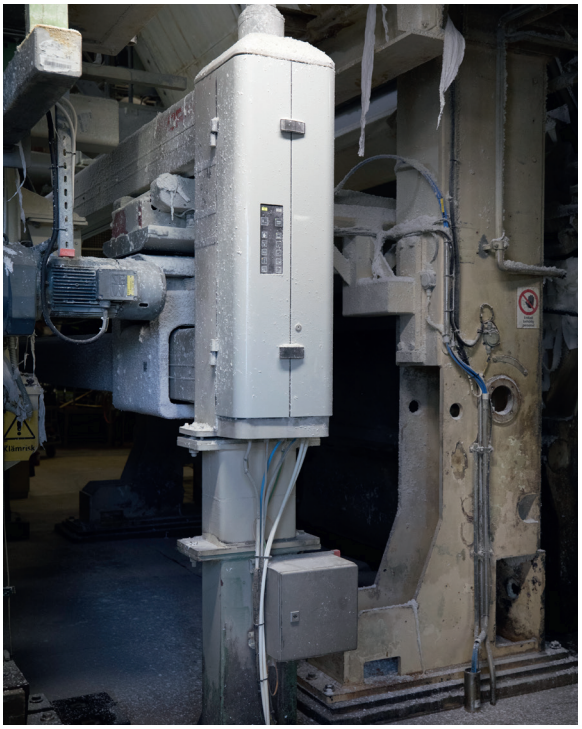
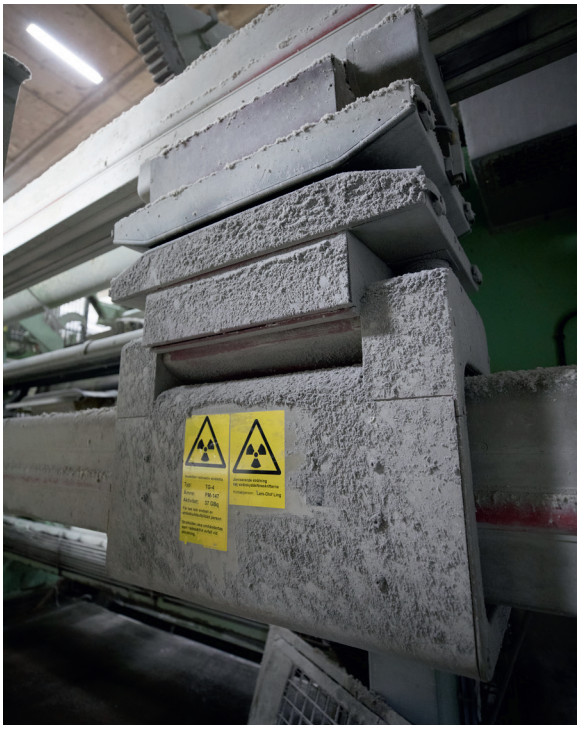
Every year, Essity in Lilla Edet produces about 100,000 tonnes of toilet and dry paper, and in order to guarantee that all paper properties exactly meets specifications, the mill continuously measures both moisture and fiber weight of the paper produced.





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Two sensors measuring moisture and fiber weight have been replaced with the infrared (IR)-based HPIR-FW sensor in PM8 at Lilla Edet's tissue paper mill.

As the replacement meant swapping two sensors with one, maintenance also became easier. Further, the new sensor is cooled with air, while the old sensor needed a water-based cooling system, something that always involves a risk among electrical components. "We don't need to maintain a cooling system, and the fewer the things we need next to the paper machines the better," says Mikael Pettersson.

Now that the infrared technology has been proven on PM8, this newer technology will be the preferred option when Lilla Edet needs to upgrade the other sensors in the future. "We will then be completely away from the sources of radiation, and free of the extra costs, work, and risks associated with them," said Mikael Pettersson. "We will be able to do this while still being confident that the measurement results are as reliable as before."

What has been done:
Moisture Sensor Hemi+ and Fiber Sensor STLP have been replaced with the infrared (IR)-based HPIR-FW sensor in PM8 at Lilla Edet's tissue paper mill. The new sensor replaces both of the old sensors and has been mounted in the existing measuring head. To evaluate the technology, the new sensor was compared to the one in place for a three-month period, a trial that confirmed to a 100 percent the reliability of the new sensor.

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