



Practice report

- > PROCESS ANALYSIS & LABORATORY ANALYSIS
- > Optimised data management at Weddel-Lehre

Optimised data management – RFID and LINK2SC

The initial situation

One water board manages a central wastewater treatment plant, three external facilities and one sedimentation pond. Five people continuously make sure that all facilities are running smoothly. Their tasks include routine maintenance work, sampling and maintaining all measurement equipment, for example making regular matrix adjustments to the installed ISE ammonium probes. In the central laboratory, the 120 samples taken on a weekly basis from 20 different sampling points are analysed.

The optimisation process is aimed at reducing the cost of transportation and staff that is required to monitor the process instruments. Furthermore, certain measures are intended to make sure that samples are clearly assigned to the different measurement points, and that the results obtained in the laboratory are accurately assigned to the relevant process probes.

All of this is possible thanks to RFID and LINK2SC technology.

The wastewater treatment plants

- ▶ 4 wastewater treatment plants
- ▶ 1 sedimentation pond
- ▶ A total of approximately 44,000 PE
- ▶ 20 different sampling points



DR 3900 Spectrophotometer

Traceable measurement results thanks to RFID

The problem

Previously, it was not possible to connect and save a measurement result with the sampling point and the name of the person taking the sample. In order to satisfy the statutory requirements, all of this information had to be documented manually.

The consequences of incorrectly assigning a sample include a high risk of error.



RFID (radio-frequency identification) is a key technology that makes it easier to identify system components. Each sample is given its own RFID tag that is linked to relevant data from the time at which the sample was taken.

The solution

Since August 2012, the new DR 3900 Photometer has been in use. The integrated RFID reader works in perfect conjunction with the LOC100 Locator. RFID tags, electronic chips that identify both the user and the sampling location, allow results to be documented in a traceable way. Each of the five users has a personal tag and all sampling points are equipped with tags. When sampling, the LOC100 reads out both tags and transfers the data to the sample bottle at the touch of a button. Back in the laboratory, the sample bottle is held in front of the RFID reader of the DR 3900 Photometer so that the complete data set can be read out.

The benefits

The LOC100 is used to record all data, including data and time, sampling location and the name of the person taking the sample. During subsequent measurements in the laboratory, this data is then saved with the date and time of the analysis, the name of the user, the batch number and expiration date of the cuvette test, and the actual analysis result in order to create a complete data set.

- ▶ Less paperwork through digital data transfer
- ▶ Error-free documentation of the relevant data
- ▶ Traceable results

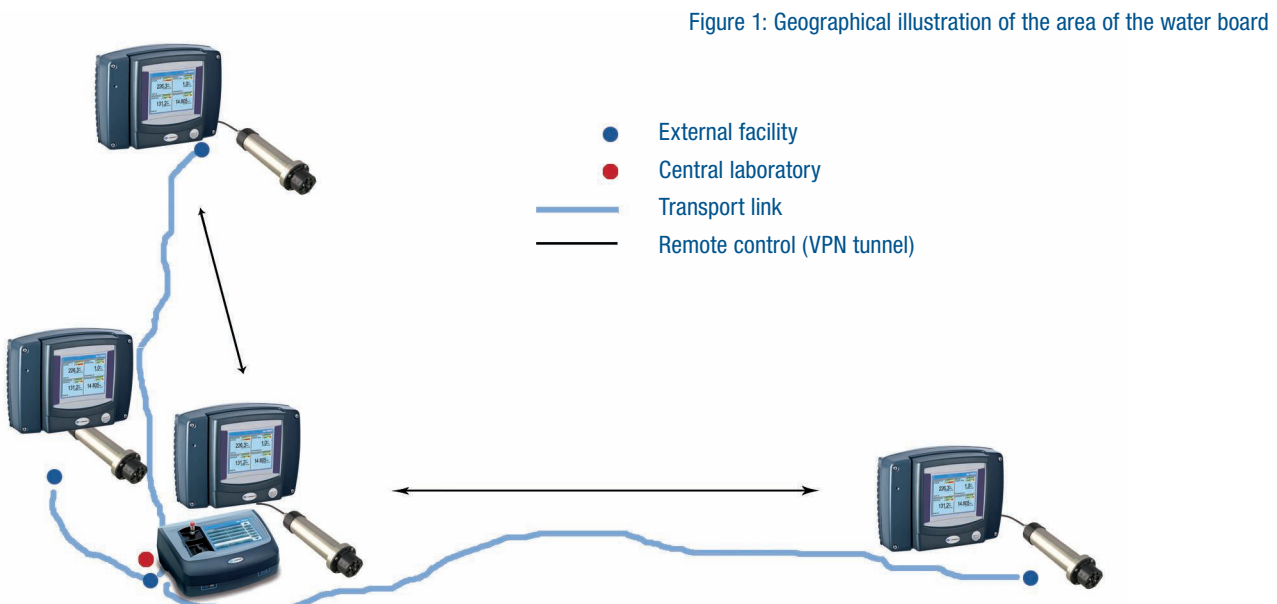


Figure 1: Geographical illustration of the area of the water board

Time-saving matrix adjustments via wireless data transfer

The problem

The external facilities are equipped with ISE ammonium probes on which matrix checks are performed regularly. To perform these checks, random samples are analysed in the central laboratory and the measurement results are compared with each other. This process allows for changes to the composition of the wastewater to be discovered in a timely manner. In turn, the subsequent matrix correction of the ISE probes makes sure that open-loop control/closed-loop control of the facility is performed smoothly.

The cost of sampling and matrix adjustments for the external facilities can be summarised as follows:

- ▶ Distance travelled: approximately 90 km per week
- ▶ Time to complete: approximately 4 hours per week
- ▶ Total per month: 320 km and 16 hours

The solution

The DR 3900 Photometer has been connected to the SC 1000 Process Controllers at the external facilities via the LINK2SC function and wireless, mobile communication connections encrypted using SSL. Using this LINK2SC network, the measurement values obtained in the laboratory can be transferred directly at the touch of a button from the spectrophotometer to the SC 1000 Controllers at the external facilities. As a result, there is no need to travel to the facilities for a second time in order to adjust the probes.



The LINK2SC connection between the photometer and the SC controller along with the connected process measuring device guarantees that water analysis work is transparent, facilitating direct comparison between laboratory and process results. Bi-directional data streams simplify processes, such as a matrix correction for an AN-ISE sc probe. Not only does this save time, it also makes measurement values more secure.

The benefits

Via the LINK2SC function built in the DR 3900 Spectrophotometer and the SC 1000 Process Controller, it has been possible to significantly reduce the amount of time required as well as staff costs.

- ▶ Reduction in transportation costs by 50%
- ▶ Reduction in the time required by 50%
- ▶ There is now no need to enter data manually, which used to carry a high risk of data being mixed up, thereby leading to errors.

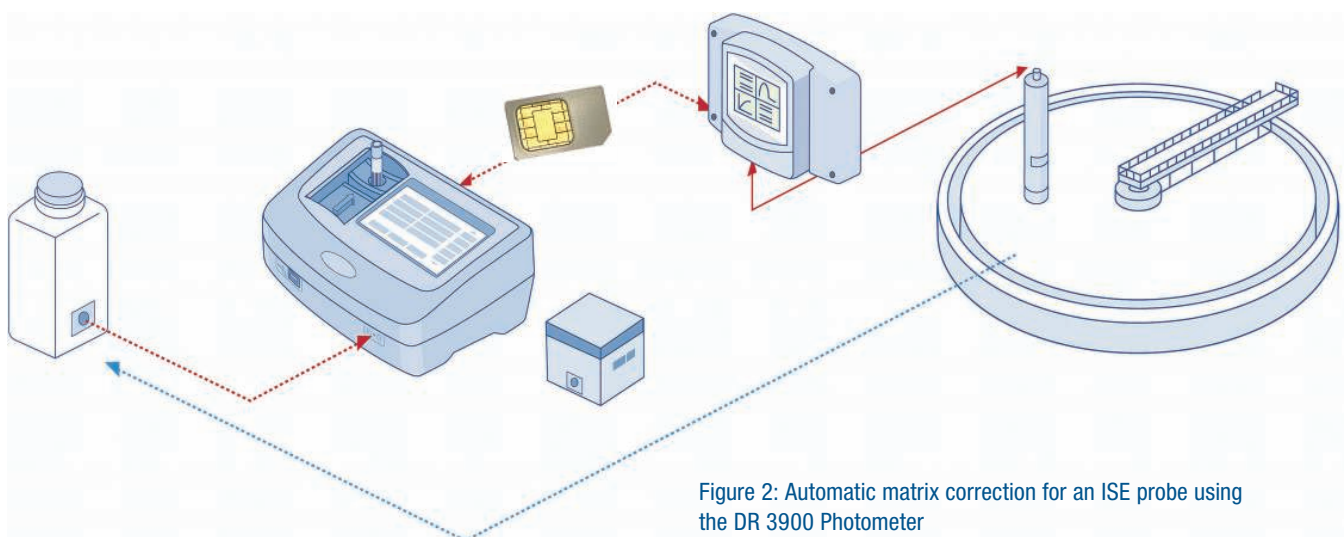


Figure 2: Automatic matrix correction for an ISE probe using the DR 3900 Photometer



DR 3900 Spectrophotometer

- ▶ Full traceability right back to the time and place of the sample
- ▶ IBR+: Increasing the reliability of your measurement values
- ▶ Data updates in a flash
- ▶ AQA+: quality assurance made easy
- ▶ Alignment of laboratory and process analysis

The compact and reliable visible spectrophotometer with reference-beam technology offers complete sample traceability right back to the sampling location using RFID technology. By means of the new 2D barcode on the cuvettes, the photometer detects the batch number and the expiry date of the reagents. The RFID module reads in and displays all batch specific information from the cuvette packaging. The batch certificate can be printed out via the photometer, and updates to methodology are performed quickly and easily via the RFID module.

The LINK2SC connection between the photometer and the SC Controller allows process results and laboratory reference values to be compared directly on the photometer. Data can be exchanged via the Ethernet in both directions, meaning matrix corrections for process probes can be performed directly by the laboratory.



RFID locator LOC100 with coloured RFID tags for samples, robust RFID tags for the sampling location, and RFID tags for users

LOC100 Locator

For reliable and recognised results, samples taken for water analysis must be identifiable and clearly marked. In order to achieve this level of traceability, each individual step in the analysis chain must be consistently recorded and documented. This is where RFID (radio-frequency identification) comes into play: RFID is a key technology that makes it easier to identify system modules. Each sample is given its own RFID tag, and all relevant data is saved and then transferred to the photometer. The entire process is documented in this manner, meaning that data is traceable at all times.

The LOC100 locator collects and transfers the data of the RFID tag, such as the sampling location, sampler, date and time.



The data transfer variant described here is just one of many different options. Are you looking for the right solution for your situation? Just give us a call.