bulk solids handling Journal



Anwenderbericht

Ensuring Gypsum Quality – Controlling of the Gypsum Production at E.ON’s MPP3

Bearbeitet von am 11. Mär. 2020
Published in bulk solids handling, Vol. 35 (2015) No. 1

.ON operate a modern coal- and biomass-fired power plant in the Maasvlakte port area in Rotterdam. The necessary desulphurisation is steadily controlled to produce a saleable gypsum product. Its product quaility is monitored via moisture measurement.

(From the archive of ”bulk solids handling", article published in Vol. 35 (2015) No. 1 , ©2015 bulk-online.com)



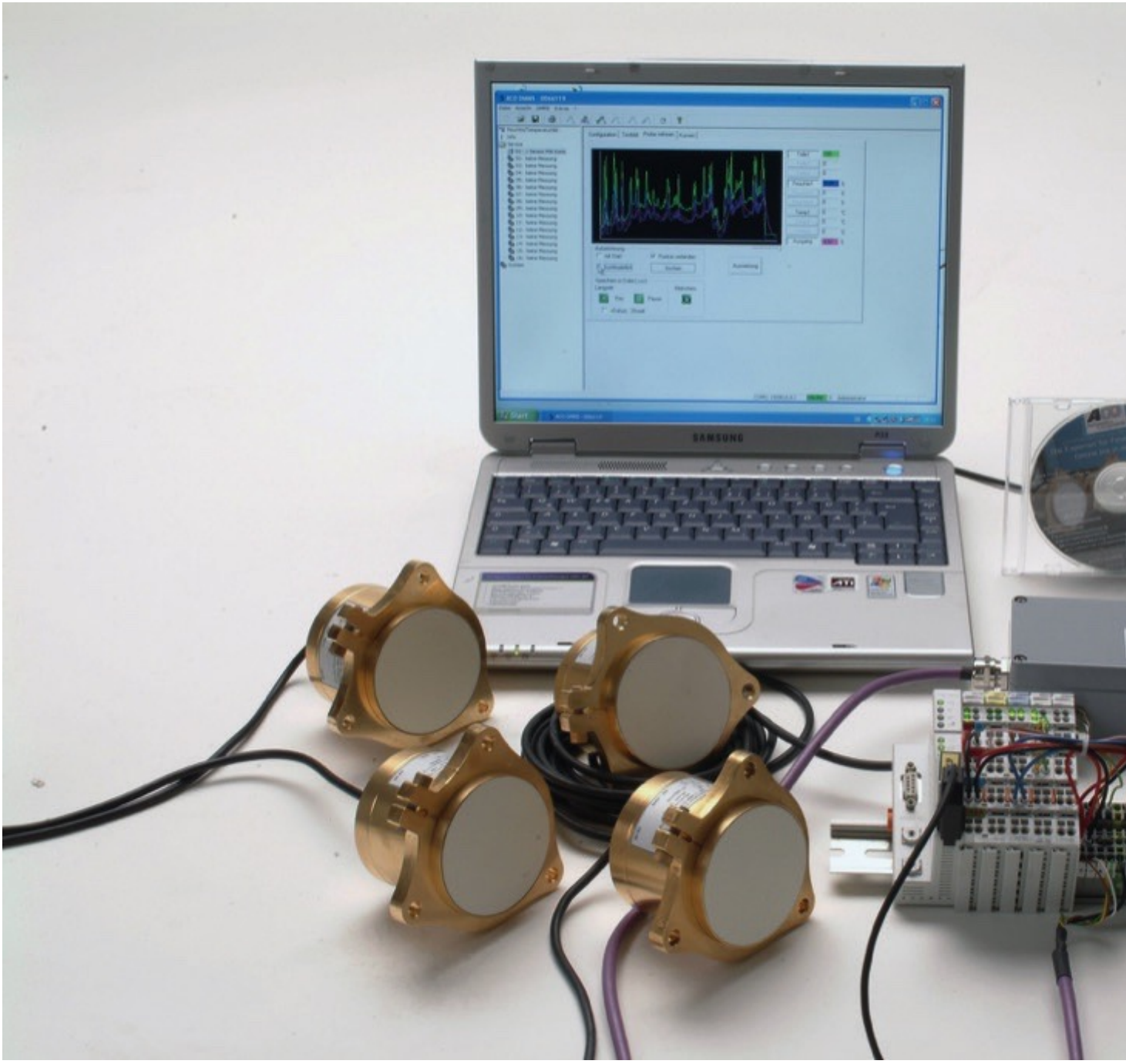
E.ON „MPP3“coal-fired power plant in Rotterdam-Maasvlakte (Pictures: ©ACO / E.ON)

The MPP3 is the most modern and biggest hard coal fired power plant with the notable gross power rating of net 1070 MW and a net efficiency of over 46%. E.ON produces steam with very high steam conditions (285 bar, 600 up to 620 °C) by using coal powder. This steam converts to energy by a turbine and a generator. The MPP3 wants to reduce the effects on the environment as much as possible. One point to reach an environmental friendly process is the optimisation of the exhaust-desulphurisation unit. The desulphurisation is made by a wet flue gas cleaning unit controlled by a moisture measurement. This flue gas desulphurisation (FGD) is far more effective than in other traditional coal fired power plants. Beyond the “MPP3” can reach a biomass-combustion up to 30%. Of course the district heating is used from the adjacent companies.

General Process Description

The desulphurisation is based on burnt lime (CaO) thereby the end product gypsum (calciumsulfad-dihydrat) arises. For the analysis of the produced gypsum there is an in-house laboratory located in Maasvlakte (Rotterdam). This in-house laboratory evaluates all the recurrent samples that have to be taken to supervise the moisture content of the gypsum. The REA-gypsum can only be traded and further processed with a moisture value around 10%. Based on this fact a continuous measuring and storage of the actual moisture value is indispensable. To avoid caking in the whole process and to guarantee the best flow characteristics in all following transport systems, a moisture measurement system is also advisable.In the MPP3 the moisture values are gained from an online–measuring system at the vacuum band filter. The two sensors are mounted in an individually developed over belt construction from ACO. This solution is very important to reach a successful and reproducible result for the moisture measurement. The digital moisture measurement signal is available without any delay. It is very easy to implement the signal into the plant via Profibus DP or an analogue output (4 mA…20 mA).

The Moisture Measurement System



Elements of the ACO DMMS moisture measurement system

The MPP3 plant has decided to use the digital moisture measurement system from ACO. The measuring principle is based on a capacity measurement method (high frequency-dielectric shift with f = 0.02 GHz). The Profibus DP interface allows the communication between the evaluation unit and the process control system of the power plant. The traditional communication via analogue signal (4 mA…20 mA) is also available. With the help of the measured moisture values the drying process is controlled and managed. The calibration was made via ACO-calibration software. This has to be performed only once (less installation costs) and the system is able to replace a sensor without the necessity to repeat the

calibration (reduces costs through less downtime)..If a further sensor is needed the evaluation unit can handle up to 16 sensors. Each sensor is able to measure 16 different materials of additional product if necessary. A penetration depth of approximately 150 mm depending on the material can be achieved. The sensor has a long term proved robust, golden hosing like almost every sensor of ACO.

Individual Execution of the Sensor Installation



Installation of the measuring head: 1. ACO DMMS sensor flush, installed into sledge; 2. scraper

One very important thing of moisture measurement systems is the mounting condition of the sensor. A constant material height and density should be given. To guarantee such optimal process conditions a special scraper is installed in front of the sensor. Furthermore the sensor is mounted on a sledge. This also

improves the surface of the material and reduces material caking in front of the sensor. Via hand wheel the material height and the sensor position is adjustable very fast and easily.Earlier experiences of ACO have shown that just one sensor, on a 2.4 meter wide belt, is not sufficient for an accurate moisture measurement, therefore the moisture measurement consists of two sensors. On one hand the reproducibility is higher and on the other hand the function of the sealing lip can be monitored (safety function). If there is a damaged sealing lip, the vacuum and consequently the drying process will not work as good as before. On one sensor the moisture value will increase highly. In this case the sealing lip should be checked and replaced.The complete over belt construction is made of stainless steel. Every evaluation unit is separated in an own control cabinet. Ias well t is possible to integrate the evaluation unit in already existing control cabinets of the plant.

About the Authors

Michael Stoll MarketingACO Automation Components, Germany