



Technical report Screening machines & Process Equipment

Pilot project remote diagnosis
SIEBTECHNIK TEMA,
Schneider Electric & Kaspar Weiss
Sand- und Kieswerke



Machine Advisor in practice

EcoStruxure Machine Advisor in practice: remote diagnosis, maintenance and control by app

Schneider Electric's EcoStruxure Machine Advisor, which was presented for the first time at the Hannover Fair 2018, is proving its worth in practice and is being consistently further-developed. Special-machine manufacturer SIEBTECHNIK TEMA in Mülheim on the Ruhr is already confidently using this useful tool and getting positive results. As part of a pilot project, two elliptical-vibration screening machines by this Mülheim-based special-machine and plant manufacturer are currently running in the EcoStruxure Machine Advisor. Both are in operation at the end-customer Kaspar Weiss Sand- und Kieswerke's gravel plant in Rodgau. Although the project is still only at the implementation stage, already the signs are that this will be a win-win situation for all those involved.

The three companies Kaspar Weiss Sand- und Kieswerke, SIEBTECHNIK TEMA and Schneider Electric have launched a pilot project for the evaluation of remote diagnoses in machine maintenance. The basis for this is Schneider Electric's EcoStruxure Machine Advisor. This cloud tool offers the key functions track, monitor and fix. Thanks to the remote monitoring, service and maintenance of machinery and plant and their conditions OEMs can offer new cloud-based services that represent real added-value for machine and plant operators. This means that they can respond to customer needs flexibly and fast. Martin Weiss, works manager at Kaspar Weiss Sand- und Kieswerke, sums up these needs: „As machine operators, by using the EcoStruxure Machine Advisor we anticipate in particular longer service lives, reliability and the possibility of rapid intervention, if incipient damage is detected." There are already signs that these expectations can be fulfilled. „The project is still at an early stage – and, as I see it, has already got off to a very promising start," stresses Martin Weiss.

The pilot project in detail



This monitors minimum, maximum and average values and continuously checks that the machines are in „good health“.

Kaspar Weiss Sand- und Kieswerke is operating solutions and products by SIEBTECHNIK TEMA and Schneider Electric and, as operators, are making the processing plant at the Rodgau/Nieder-Roden works available for the tests. Schneider Electric is providing Industry 4.0 technologies: an iPC with the tailored software solution,

the cloud and the evaluation software. SIEBTECHNIK TEMA is providing support with the configuration of parameters for the electronically controlled elliptical-vibration screening machines. So it was initially possible to obtain data without further sensors and to use them for other purposes. With the health app within the Machine Advisor's monitor function Schneider has developed an application for carrying out a machine condition check with eight parameters during the training period. This monitors minimum, maximum and average values and continuously checks that the machines are in „good health“. If after successful testing the health app is officially cleared for operation, it will reliably identify anomalies, that is, deviations from normal values, and accordingly send the operator a predictive message by email. That is an important step towards enabling OEMs to offer added-value services in the form of predictive maintenance.

If the health app registers, say, a sustained current rise, a service or change of the screening machine bearing, for example, is recommended during the next overhaul. That way a machine stoppage and consequently a break in production are prevented.





Initial experiences and successes

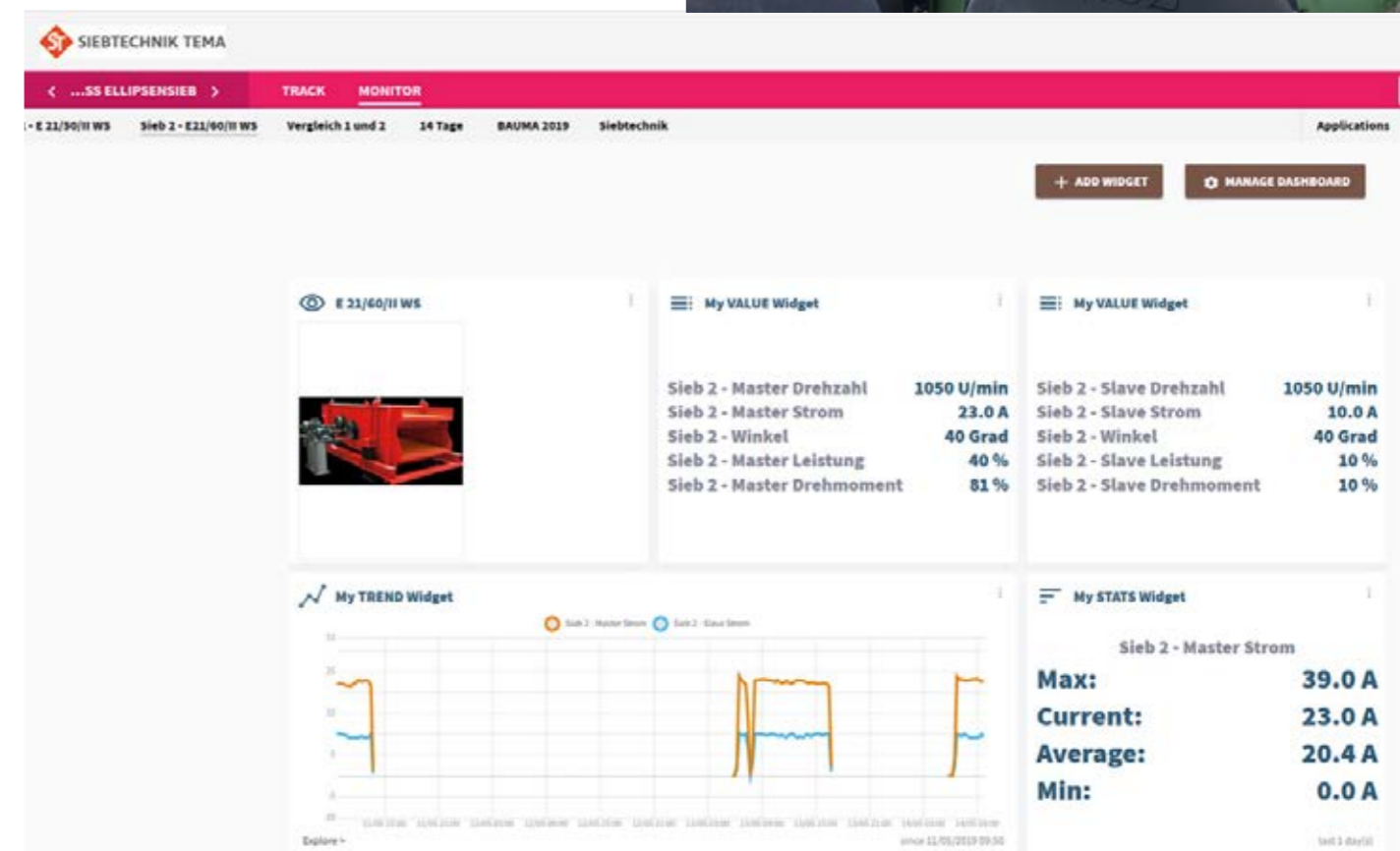
The initial results are very promising. At the BAUMA 2019 show in April SIEBTECHNIK TEMA presented to the public live data from the two machines on a gigantic television screen. The feedback was wholly positive. Already the signs are that it will be a win-win situation all round: Kaspar Weiss Sand- und Kieswerke is continuously receiving measurement data and can use them for, amongst other things, documentation and optimisation of energy consumption. The next step will be energy monitoring – both in the cloud and on site on the iPC. Anyone able to provide proof of precise energy consumption per system and time unit will in cases of modernisation be entitled to receive a grant. Schneider Electric will have the opportunity to further perfect a specific application that communicates with its own EcoStruxure control system and is installed in the vicinity of its own research centre. SIEBTECHNIK TEMA will be able to conduct further activities in the area of digital machine monitoring and remote maintenance on the basis of and experience with this application.



For now the task within the framework of the pilot project consists in determining meaningful parameters that track the behaviour of the screening machine, identifying unreliable deviations and requesting or initiating action – for example, a requisition made by a member of the service department at SIEBTECHNIK TEMA. The three partner companies are working closely together to gradually perfect this service – customer-focusedly, flexibly and marketably.

The make-up of the project team – consisting of a plant operator, a solution provider and a machine-manufacturing company – leads us to expect interesting results. The main premiss: operation of the preparation plant is aimed at manufacturing required products like sand, gravel, stone chippings and grits as reliably and as economically as possible.

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THE NEXT STEPS



Since March the following parameters have already been in the cloud: the drive shaft speeds on both screening machines, set throw angles and electric current requirements, electric torques and electric power requirements for all drive motors. In the coming months further data from the existing control system will likewise be prepared for loading into the cloud. They will include data that are also useful for energy management, such as energy consumption, total operating hours of the screening machines and operating hours since the last service. Consideration is also currently being given to integration of the progressive distributor of the central lubricating system. Also wanted is the compressed air monitoring of the pneumatic suspension of the screening machines. The instant a threshold value is fallen below the compressor is automatically started up. A predictive message triggered by this would indicate a leaky pneumatic suspension system – a further opportunity to service the machine preventively and on schedule. A further aspect is the monitoring of the screening machines with emphasis on vibration analysis and its outcome with regard to service action required. For this suitable sensors must be selected, installed on site and linked to the cloud. SIEBTECHNIK TEMA is currently

working intensively with two manufacturers of sensor systems. Once the basic technical framework is in place, the following tasks will be on the agenda: checking of lateral vibration in the area of the bearing systems together with bearing condition monitoring, monitoring of vibration data at the four corners of the screen box and bearing temperature checking. With regard to vibration insulation it must be agreed whether it would be advisable to install a pressure sensor in each individual air spring or axially.

OEM service 4.0

As an OEM, SIEBTECHNIK TEMA has for a very long time been offering a service that ensures the customer's production. The offers comprise necessary spare parts and personal service, developing an individual maintenance concept jointly with the customer and so guaranteeing the highest possible machine availability. Service modules like preventive maintenance and repair can now be even better and more reliably configured with the EcoStruxure Machine Advisor. Maintenance and service tasks need no longer be carried out right on site



but can be just as reliably undertaken remotely. From SIEBTECHNIK TEMA's point of view it is important to obtain information about a system in the area of digital machine monitoring and remote monitoring in order to expand one's own portfolio. The offer of optional condition monitoring of machines is a positive sales argument in the case of new machines and in the service sector and is a necessary technique for guaranteeing, for example, the availability of machinery in certain areas of application.

Getting closer to series production

Schneider Electric is likewise satisfied with the outcome: the two live machines and the customer's enthusiasm inspire confidence that plant systems will in future be standardly fitted with the EcoStruxure Machine Advisor. More still, the empirical values of the project, based on continuously tracked data, will be incorporated into the further development of machines. Because real information can now be obtained, the uncertainty factors diminish and definite conclusions can be drawn for development.

For example, the level of machine utilisation can now be clearly seen. „The installed quantities are necessary for the starting phase. The rotating unbalance mass must be lifted from the start position (bottom/suspended) to above the topmost pivot point. Once the unbalance mass is rotating, just around half of the installed power is enough to keep the machine operating. It therefore becomes clear that here only a short-time reduction of high electric power is occurring and is not constantly affecting the total requirement of the gravel plant. Power can therefore be optimisedly drawn from the main power supply, e.g. by selecting a smart starting sequence for all machines. So smart data have considerable benefits to offer machine manufacturers, e.g. with regard to overall electrical planning, and the end-customer can expect increased machine availability and reduced energy costs.



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