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A GREEN CONSTRUCTION SITE: NO LONGER JUST A VISION



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Ecological factors become more and more important at construction sites.

Green construction sites are not an illusion but can become reality. The necessary procedures and machines are already available. Member company applications show how to achieve a symbiosis between ecology and economy.

By Nikolaus Fecht

A truly respectable balance: over the last ten years, the energy efficiency of construction machinery has increased by up to 15 percent, depending on specific type. At the same time, emissions of particles, nitrogen oxide and hydrocarbons have fallen by up to 97 percent. Noise pollution has also been halved. These developments are being promoted by the VDMA in the framework of the Blue Competence initiative. In the long term, companies from

the construction machine industry involved in the initiative are looking at the vision of "green" construction sites and satisfied customers.

Bomag GmbH from Boppard also supports the Blue Competence sustainability initiative. "It is important and also a positive development that this VDMA initiative is creating a cross-manufacturer platform in the context of green construction sites," underlines Robert Laux, Technical Director. "The initiative informs the general public about the sustainable use of modern construction machinery for man and the environment." At the same time, it gives the industry incentives to promote the sustainable added value of their new developments. Bomag expects the initiative to introduce a voluntary, self-imposed commitment to reduce CO2 emissions. "Reducing CO2 levels is also the prime specifically measurable target that we have set ourselves for our sustainability activities. Here it is important to view the whole process on the construction site and not just the individual machine," explains Laux.

Gas-driven tamper

The construction machine manufacturer takes a varying approach to achieve the long-term goal of the green construction site: for example, the company from Boppard has developed a gas-driven tamper. Tampers are mobile soil compacting machines. Carbon monoxide emissions from the tamper can be reduced to practically zero when it runs on propane gas. At the same time, working at sites with a poor exchange of air, such as deep road ditches, is now much safer and pleasanter for the worker than when using conventionally powered tampers.

"Many of our machines also have what we call an Eco Mode System," says Laux. If the machine is not being used at full power, the electronic control automatically reduces the engine speed. This cuts both CO2 emissions and noise levels. The new machines also comply with currently valid emission directives.

Fast, robust and sustainable heating

Bomag has also invented a heating system for asphalt pavers. This new screed heating has heating elements that are cast directly in an aluminum block. "The heating thus heats up very quickly; the heating elements are much more robust with a far longer service life. In this way, we can achieve CO2 savings in heating energy while at the same time reducing wear-and-tear on the machines," says the Technical Director in praise of the new development. The company will be presenting all these developments at the bauma 2016.

The construction machine manufacturer also has a few wishes for the political sector. Together with many other companies in the construction machine industry, the firm advocates the introduction of an investment incentive for modern, exhaust-optimized construction machines. "This kind of incentive could help to ensure that existing machines are replaced promptly with the latest, more environmentally friendly models," says Laux, quite certain about what he says.

Furthermore, in many cases the clean air measures imposed by local authorities are in direct contradiction with current exhaust emission directives. Here there is an urgent need to harmonize and coordinate the various regulations.

Sustainable technology increasingly significant

Wirtgen GmbH in Windhagen has also pursued the objective of "constantly enhancing the ecological and economical aspects of our own products," says Dr. Günter Hähn, company CEO. And not just in view of social responsibility but also to give Wirtgen a USP to make it stand out from the competition as technology leader. Sustainable and efficient technology is becoming an increasingly significant customer benefit. The company from Windhagen has therefore forged ahead with major further development of its products in recent years.

Publications such as the Blue Competence brochure supported by Wirtgen show what the German and also European construction machinery sector has already done and intends to do. The branch is using publications of this kind to show that corresponding developments would have taken place under its own initiative anyway, even without statutory requirements. In this way, the industry has enhanced energy efficiency while reducing CO2 emissions at the same time.

"We show that the new technologies are available," stresses the CEO. But they need to be put to greater effect by users than hitherto. This includes replacing old machines with new state-of-the-art equipment. Upgrades are technically not feasible and do not make economic sense.

New machines instead of upgrades

One particular example for new, sustainable construction machinery is being used in Italy. A Wirtgen cold recycler and soil stabilizer is at work repairing the A4 motorway between Turin and Triest. Cold recycling repairs the structure of damaged roads, producing a recycled surface that is extremely durable and long-lasting. The stabilized material is recycled to one hundred percent, thus protecting the ever scarcer resources for road construction while reducing the amount of transport involved by up to 90 percent and fuel consumption rates by maximum 12 liter per ton paving material.

Market as driving force

Cold recycling therefore reduces CO2 emissions by up to 70 percent compared to conventional road repairs, depending on binding agent and quantity. An Italian road construction company was involved in a road maintenance project with one of the new machines, which will also be presented at the bauma in Munich. This project involved cold recycling at several construction sites over altogether more than 20 kilometers on the slow lane of the motorway which takes the heaviest loads resulting from constant heavy-duty vehicle traffic. This example shows that "ecological and economic improvements to machinery with new technology are most effective when driven by market forces instead of statutory regulations," Hähn is convinced. Companies such as Wirtgen therefore advocate state support for the deployment of new machinery rather than upgrades and retrofit solutions.

Series production of sustainable cylinder

As a proprietor-run family company, Liebherr-Hydraulikbagger GmbH in Kirchdorf stands for values such as "sustainability, durability and responsibility," says Werner Seifried, company CEO. One example for sustainability consists in an energy storage cylinder that reduces fuel consumption in material handling machines by up to 35 percent, which brought the company the bauma innovation prize in 2010. Today the cylinder is a standard feature in Liebherr machines.

"This permits high performance rates at fuel consumption levels that were hitherto unthinkable. Our machines therefore offer far greater energy efficiency, giving a completely new significance to how we handle fuel as a precious resource," says Seifried who is pleased at the positive development.

The low fuel consumption in the machines results not only from optimized machinery and components but also in particular from the high level of technical expertise that goes into development and production.

“Directly influencing the ideal operating point in the diesel engine and hydraulic system gives us the greatest possible scope for achieving maximum energy efficiency,” explains the CEO. “But when it comes to green construction sites, the actual construction machine takes a back seat.” Over the next few years, greater significance will be attributed to the work process at the machine, as well as connectivity between the various machines. This involves questions such as:

- Which is the right machine?
- How are the machines used correctly?
- When do standstill phases occur?
- What are the basic workflows like?

The CEO sees these as being key issues where Liebherr needs to develop solutions. There is also an increasing trend to more electronic components and software in construction machinery, with site-specific apps or smart connectivity and optimization strategies to help the operator with his work. Liebherr has a wealth of system expertise in this field. For decades the company has been developing electronic components and systems not just for construction machinery. At the bauma 2016, Liebherr presents its current portfolio of construction machinery conforming with the EURO IV exhaust emissions standard. The new wheel loaders illustrate how an even better level of energy efficiency has been achieved in the development of the new machines.

Appeal to the political sector

But it will take more than inventive innovations by the construction machine industry to pave the way to the green construction site. Seifried therefore appeals to the political sector “to create clear, unambiguous framework conditions to offer legal certainty at all times for us as machine manufacturers and also for our customers.” Stand-alone solutions are not the way forward, as no-one is helped by a small-state mentality. Liebherr is therefore also involved in VDMA research projects to gain an even better understanding of the framework conditions and requirements for the green construction site.

Focus on high recycling rate

Komatsu Hanomag GmbH from Hanover also pays special attention to sustainability. “Already during the initial concept phase, we consider the whole service life of the machine, aiming for example also at a very high recycling rate of the various parts and components,” explains Jörg Hermanns, Deputy General Manager at the company’s European Technology Center.

Komatsu is also working towards sustainable production by introducing energy-saving lighting, constantly cutting back water consumption levels or using water-based paints. This eco-strategy continues with the products themselves. “We develop fuel-efficient, quiet construction machinery to protect the environment, as well as giving the customer added value,” says Hermanns. Komatsu’s ambitious target is to undercut the statutory limit values rather than just meeting them.

The Japanese construction machine manufacturer also has its eyes on the long-term objective of the green construction site. A lot is happening with the machines: Komatsu offers its machines for example in a wide range of finely graduated sizes so that customers will find the ideal solution for each specific construction site. There is also a hybrid crawler excavator with a considerably reduced fuel consumption rate, according to Komatsu. In April, the bauma in Munich will show what the green construction site of the future will look like. Besides a hybrid excavator, Komatsu also presents iMC machines with information and communication technology, a concept which has been boosting the construction machine industry for several years now.

“An iMC machine for example can be a bulldozer with an automatically guided blade, or an excavator that helps the driver to keep to a stipulated profile,” reports Hermanns. Computer support reduces the number of procedures needed to complete the task, with shorter machine working times and a directly positive effect on fuel consumption and emissions.

More efficient use of machines

The green construction site stands and falls with machine operation. “Komatsu has introduced a machine management tool for analyzing how the machines are used,” explains Hermanns. “We also train the driver at the customer’s request to facilitate more efficient use of the machines with greater benefit.” Unfortunately, the operating manuals are meanwhile so huge that users find it difficult to be constantly aware of the complete contents and to know all possible settings and adjustments that the machine offers.

Making machine handling easier to learn

Komatsu specialists therefore show the drivers which settings and adjustments are most important for their specific situation in the interests of more efficient work processes. They train the user to make it easier for him to learn how to handle the machines better. "We are also trying to make it easier to handle and adjust the machines in our new developments," explains Hermanns.

But in his opinion, the political sector also has a role to play on the way to the green construction site. "Here in Europe, they should make it possible for machines that comply with valid statutory regulations to be used throughout all of Europe," says the expert. "Some cities that have problems with fine dust pollution make special demands on machine operators and on the manufacturers, resulting in a great need for support for a small number of machines." This ties up resources in the construction machine industry and puts the brakes on developing new ideas and concepts for the green construction site. ■

Further Information

[VDMA Construction Equipment and Building Material Machines](#) | [VDMA Blue Competence](#) | [bauma 2016](#) | [Bomag](#) | [Komatsu Hanomag](#) | [Liebherr](#) | [Wirtgen](#)

Contact

Joachim Schmid, VDMA Construction Equipment and Building Material Machines
E-Mail: joachim.schmid@vdma.org