Cooling water lines with steament®

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Dear readers,

The widespread difficulties in the economy as a whole have now also reached our company. Facing a drop in electricity demand, numerous coal-fired power stations are currently working at significantly reduced capacity or have even been taken off line completely.

This means that the availability of fly ash from hard-coal-fired power plants is severely limited. The extremely low utilisation of power stations has also affected the slag tap units and thus the production of slag tap granulate.

No end to this extremely difficult situation is yet in sight. As a precaution, we have informed our customers of the expected bottlenecks in the supply of power station by-products and at the same time pointed out that we will do everything in our power to ensure supplies to our customers wherever possible. This also includes the supply of alternative products.

Even if the present economic position is unpleasant and unsatisfactory for all those involved, we should not be disheartened, but work together with all our strength to overcome the crisis together.

I would ask you once again to bear with us in the current difficult situation, and trust that we will all emerge strengthened from the present crisis.

Yours, Rudolf Mauder
Chairman of the Board of Management of Evonik Power Minerals GmbH
MINERALplus and REMEX pool their strengths

MINERALplus, a wholly owned subsidiary of Evonik Power Minerals GmbH, founded the project company MINEX last November, contributing the facility for high consistency stowing in the Sodawerke Stassfurt salt caverns and all associated contracts to the new venture. On behalf of REMEX, Deutsche Gesellschaft für Wertstoffverwertung mbH (DGW) purchased 50% of the shares in MINEX. Both DGW and REMEX are wholly owned subsidiaries of REMONDIS.

REMEX is a specialist service provider in the fields of disposal and treatment of mineral waste and production of high quality recycled construction materials, and has long-term contracts with waste incineration facilities for the disposal of fly ash and reaction salts.

The high consistency stowing system in Stassfurt, commissioned in April 2008, is a joint project by MINERALplus and Sodawerke Stassfurt. MINERALplus is the owner, and Sodawerke operates the plant and is responsible for permits and approvals.

In a pilot project unique throughout Europe, stowing material for the backfilling of caverns has been successfully developed, fulfilling the environmental protection requirements, increasing the stability of the cavities below ground and enabling existing caverns to be used for soda production. For not only can the displaced brine then be used, but the caverns are strengthened by the packing material and further salt can then also be extracted.

The process was developed with scientific support from universities and repeatedly checked by the authorities for compliance with mining and environmental quality standards.

For MINERALplus, the new plant also means full capacity utilisation for the mixing plant in Gladbeck, for that is where the stowing material is manufactured to approved formulae. In Stassfurt, the material is then rendered pumpable for packing of the caverns by adding brine.

The main components are fly ash and reaction salts from waste incineration plants. The joint project company with REMEX assures supply of these materials to the stowing plant.

Detlef Heine, managing director of both MINERALplus and MINEX, nevertheless repeatedly draws attention to the environmental aspects in this connection: Subsidence phenomena can be prevented, the discharge of salt into the groundwater minimised and the residues from waste incineration facilities safely disposed of by complete embedding in the halite.

In the first year, around 20,000 tonnes were stowed in the plant in trial operation. In the second year of operation a production quantity of 90,000 tonnes, and following completion of the final development stage of the plant 200,000 tonnes is to be achieved.

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Current developments in the use of fly ash as a concrete additive

The major area of application for fly ash is its use as an additive in concrete. The range of applications extends from non-reinforced concrete products, ready-mix concrete and prefabricated concrete parts to special purpose concrete. Extensive research work in past years has smoothed the path into construction standards and thus enabled the use and allowability of fly ash as a binder component in the area of civil engineering regulated by official building inspection.

At the end of 2007, North Rhine-Westphalia was the first German state to declare in an agreement with various sellers of fly ash that fly ash certified to EN 450 should be recognised as a product /1-3/. This is a further important milestone on the road to positioning fly ash as a high quality construction product in its own right. Figure 2 provides an overview of the applications for fly ash in 2007.

The areas of application presented by concrete products and prefabricated concrete parts are of especial importance as they are manufactured throughout the year and present an opportunity to design concrete outside the usual standards. In addition, prefabricated parts have been increasingly manufactured and sold by the concrete industry in recent years.

From 2002 to 2007, sales in Germany in this field of application rose from 482,000 t to 669,000 t (Figure 1).

Formulae for concrete products are mostly developed purely according to technological points of view. The minimum cement content and limits to the content of fines merely play a subordinate role. For concrete paving blocks in particular, the decisive factor is to achieve a high compactibility of the earth-moist concrete, so as to obtain the necessary green-state stability in the production process and the required compressive strength of the finished block. EN 1338 /4/, which applies to paving blocks, provides for materials to be used in the manufacture of concrete paving blocks when their suitability in terms of properties and performance is demonstrated. The use of fly ash contributes to fulfilment of the requirements defined.

Prefabricated parts generally require concrete of a relatively high quality. In this application, concrete types whose composition limits deviate from the standards are often designed. An example worthy of mention is the tubbing concrete for the Katzenberg Tunnel /5/. Stringent de-
mands were placed on this concrete, especially in terms of resistance to sulphates and resistance to damaging alkali-silicic acid reactions. In order to meet the requirements, a formula with a cement content of 200 kg/m³ and a fly ash component of 120 kg/m³ was selected, the suitability of which had been demonstrated in extensive studies. The concrete was approved for this individual case by the German Railways Authority. In this development, and with other formulae, we are able to draw on intensive research and development work and our technical know-how.

With great probability, two trends will be discernible in future in the prefabricated parts industry and in the other applications where fly ash is used as an additive in concrete. There will be efforts to use concrete with an improved life cycle analysis, in order to bring about ecological benefits and exploit ergonomic and economic advantages with easily compactible and self-compacting concrete. Where concrete does not require tamping, there is no noise or harmful vibration. Economy is probably the main argument for an industry which has to combat numerous cost factors. Fly ash is an important component in these formulae.

Sources:
[1] DIN EN 450-1; Fly ash for concrete - Part 1: Definition, specifications and conformity criteria; May 2005
[2] DIN EN 450-2; Fly ash for concrete - Part 2: Conformity evaluation; May 2005
[4] DIN EN 1338; Concrete paving blocks. Requirements and test methods; August 2003
Hargreaves Coal Combustion Products Ltd. – The new member of the Power Minerals business line

At the start of the year, Evonik Power Minerals UK contributed its activities in Great Britain to Hargreaves Coal Combustion Products Limited (HC-CPL). The new company was founded together with Hargreaves Services plc, a well-known listed British service provider in the fields of logistics, fuels and recycling. HCCPL is now the largest independent recycler of residues from hard coal.

Evonik has appointed Thomas Duve as Chairman of the Board of the new company, and can thus exert a decisive influence on the activities of the joint venture.

HCCPL with its current staff of nine markets a total of 1.5 million tonnes of fly ash per year. The fly ash comes from eight power stations spread across the whole of Britain. The largest quantity to be marketed originates from Drax in Yorkshire, one of Europe’s largest coal-fired power stations with a capacity of 4,000 MW.

Right from the start, Evonik Power Minerals pursued a permanent presence in Great Britain, instead of managing these activities from abroad or employing agents.

This procedure has proved correct, as in this way both companies have found in a period spanning more than two years that their views of the market are in harmony and the expertise of one complements that of the other. Evonik and Hargreaves are confident
that in this case one and one makes rather more than two.

Numerous plans for the expansion and development of the new company’s business activities now have to be implemented. It is intended, for example, to improve the networking of sources on the continent with the potential markets for hard coal ash in the British Isles.

The close cooperation with Hargreaves Services plc is a further step along the way for Evonik Power Minerals to develop its competence as a service provider to the power generation industry and a partner to the construction industry on a European level.

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News in brief

Andreas Schneider of ASIKOS Strahlmittel GmbH qualified from the basic training course in corrosion protection organised by the German Corrosion Protection Association (BVK) in February 2009. Together with surface preparation, the course covered the fundamentals of coating materials and their application processes. The subject matter was rounded off with the fields of quality control, scaffolding construction, ventilation and air-conditioning, safety at work and environmental protection. ASIKOS is continuing its strategy of making its support services even more customer-orientated.

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ASIKOS employees Ursula Herwagen and Elke Ehrhardt have embarked on their well-earned retirement after many years with the company. Claudia Grommes and Melanie Rentmeister, two new members of staff, will take on their duties.

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DW reinforced concrete pressure pipes  
steament® added in power station cooling water lines  
by Dipl.-Ing Hans-Georg Müller and Dipl.-Ing. Gregor Jarosch (VDB)  
DW-Betonrohre GmbH, Dormagen  

There is still a great need for coal-fired power stations. With the closure of German power plants that have come into age, demand has arisen for the replacement of 35,000 MW capacity – a gap in supply which has to be closed.

RWE Power is constructing two 750 MW units in Hamm, Westphalia, with completion scheduled in 2011. The size of this power station project can easily be illustrated by a single figure: at peak periods, no less than 3,000 people are employed at the construction site.

**Individual development work with positive results**

Concrete as a construction material plays a key role in the implementation of this gigantic building project. The main cooling water line, with a length of around 1,000 m, is one of the outstanding achievements. It consists of heavy duty reinforced concrete pressure pipes, and conveys up to 19 m³ water per second. This is only the second time that Köster AG of Osnabrück, appointed to perform the extensive infrastructural work, has laid such a pipeline. With successful results.

**High demands for heavy duty reinforced concrete pipes**

Heavy duty reinforced concrete pipes which are worthy of their name have to fulfil important criteria: high pressure resistance, freedom from leakage, durability and – cost-effectiveness. DW Betonrohre GmbH regards its pipes, which are individually produced by the vibration process and hardened in stationary steel formwork, as its "trademark for quality".

Concrete formulae established jointly

The DN 3000 mm pipes with a bell diameter of 4,090 mm and a wall thickness of 300 mm have an overall length of 5,000 mm. As a result of the extreme splitting forces, especially in the joint area, a bell design additionally reinforced with a cast-in steel ring (internal diameter 3,770 mm) was selected. 21 m³ of concrete C45/55 was required for the 56 t heavy pipes with a reinforcement component of 6 t. They are non-prestressed and untensioned, with no steel jacket.

Special formulae had to be developed for the pipes required, to fulfil the high demands of the owner and the construction company. With a drop height of over 5 m, special precautions for the concrete had to be taken. The requirements specified by the standards for the composition of the concrete were XC4, XD2, XA2, XM2, which is unusual for reinforced concrete pipes.

With the use of steament® as an additive, the concrete exhibits an extremely dense packing, an optimum grading curve with maximum gradations down to the smallest grain size, and the use of latest generation admixtures. The construct of reinforcement and formula had to be optimally matched. This required the know-how of an experienced, innovative...
pipe manufacturer, with whom all the design and technology issues were finally resolved and implemented in close cooperation.

**Practice-oriented load tests at the works and at site**

DW-Betonrohre had specially developed a testing facility for the reinforced concrete pressure pipes and installed it at the works. Various usability tests were therefore conducted prior to series production. These included a bend test, a shear test, and a general leakage test. The latter was performed at the works on each individual pipe, fully filled with water at 6.5 bar. In addition, a joint leakage test was carried out at site after laying of the pipes, and then on completion of the piping system a pressure test was performed on the entire line. Special precautions and safeguards were also necessary for the pressure tests organised at site, on account of the substantial pipe dimensions and the level of pressure involved.

From the point of view of logistics, a precisely coordinated timetable down to the finest detail had to be established – and maintained. The great weight and large dimensions of the pipes, for example, meant that only special vehicles could be used for transport, and they could only be moved at night. Heavy lifting gear – mobile hydraulic cranes with capacities of 500 t and 700 t – was deployed for unloading at the construction site and for laying.

The construction work for the new power station units started in Hamm in February 2008 is well within schedule. It can be assumed that in spite of the unusually short construction period the two new units will go on line promptly in 2011.

The Technical University of Aachen summarises the properties of the DW reinforced concrete pressure pipes in its study “Economic Aspects in the Use of Heavy Duty Reinforced Concrete Pipes” (conducted in 2008) as follows:

**Attributes of Liner**

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<tr>
<th>PE-HD Liner</th>
<th>EP-Liner</th>
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<tr>
<td>Polyethylene (PE)</td>
<td>Duroplast, output of polyaddition</td>
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<tr>
<td>Density 0.96 kg/dm³</td>
<td>Density 2.23 kg/dm³</td>
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<tr>
<td>Colouring limited</td>
<td>Colouring free</td>
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<tr>
<td>Use for extradosed arch pre-cast segments restricted</td>
<td>Unlimited use for extradosed arch pre-cast segments</td>
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<tr>
<td>Mechanical linkage between concrete and plastic liner with tie bar elements</td>
<td>Actuated compound of the concrete system</td>
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**Chart**

- Precise fixing of reinforcement in the mould,
- Maximum possible homogeneity of grain and matrix distribution,
- Low porosity resulting from soft consistency and optimum compaction,
- Highly dense structure and water-tightness of the concrete,
- Full passivation protection with a deep paste coating,
- Extensively pore-free internal surfaces with high surface hardness,
- Maximum dimensional accuracy in the area of the pipe joints,
- Very good hydraulic properties due to smooth surfaces,
- Form removal only when high compressive strength of concrete reached.

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Service makes the difference

Nowadays, the success of a business no longer depends solely on having products which are in line with market requirements, but increasingly also on the methods and expertise with which a company acts in the market environment. Better service is nowadays a significant decision factor for businesses. Individual service is often more important in purchasing decisions than a favourable price. A high level of delivery service can therefore make a significant contribution to customer satisfaction, and enable a supplier to stand apart from the competition. High customer satisfaction is an important corporate objective at ASIKOS Strahlmittel GmbH, and logistics is therefore valued just as highly as the quality controlled production at the Lünen and Duisburg works.

In 1989, Reinhardt Jünemann defined logistics quite pragmatically: “The function of logistics is to make available the right quantity of the right things as the objects of logistics (goods, people, energy or information) at the right place (source and destination) in the system, at the right time, in the right quality and at the right costs.” This definition sounds rather simple and self-evident, but fulfilling these criteria with the expected service requires fundamental preparation.

In particular, the production flow concept in the context of construction site logistics and the associated high level of delivery service must guarantee material supply in the right quantity and quality and at the right time. Excellent delivery service which meets high demands is an integral part of achieving the objective in the performance of an order at a construction site. Readiness, reliability, flexibility and quality of delivery are further components in the achievement of this objective. The preparations for a sophisticated logistics system start at the works themselves. In order to permit flexible responses to the customers’ wishes, production logistics must be controlled in such a way that such wishes concerning order and delivery conditions can be accommodated. For the supplier, this means flexible production, and also the maintenance of warehousing facilities and the opportunity to select a suitable carrier. Delivery quality also plays a decisive role in this connection. This concerns the accuracy of deliveries, i.e. how accurately the orders are fulfilled in terms of nature and quantity, and the delivery condition, i.e. whether the goods arrive at

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<th>Characteristics of delivery service</th>
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<tr>
<td>- Delivery time</td>
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<td>- Delivery reliability</td>
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<td>Number of requisitions delivered</td>
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<td>promptly</td>
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<td>Total number of requisitions</td>
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<td>x 100 %</td>
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<tr>
<td>- Delivery preparedness</td>
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<td>Requisitions fulfilled</td>
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<td>ex-warehouse</td>
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<tr>
<td>Total number of requisitions</td>
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<tr>
<td>x 100 %</td>
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<tr>
<td>- Delivery condition</td>
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<tr>
<td>Number of cases of damage or loss</td>
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<td>Total number of requisitions</td>
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<td>x 100 %</td>
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<td>- Delivery flexibility</td>
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<td>Number of special requests fulfilled</td>
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<td>Total number of special requests</td>
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<td>x 100 %</td>
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site in a damaged or undamaged condition. This requires a high degree of quality management by the supplier, with regard to both production and loading. Both of these must be subject to quality surveillance.

**Tailor-made solutions for construction site logistics**

ASILOS Strahlmittel is geared to respond to customers’ wishes in many respects. There are three different types of site containers available, which are delivered loaded to the sites. Selected hauliers with silo trucks are used for refilling, so as to ensure compliance with the production flow at site. The logistical range includes the opportunity to have abrasives delivered in 25 kg bags on pallets or in big bags. ASIKOS also ensures that trucks with unloading facilities for these types of packaging can be dispatched. We make sure to employ carriers who are familiar with the requirements at construction sites and therefore have special equipment such as hose extensions available. Especially in logistics, the time factor plays an enormous role. "Just in time" has been a catchphrase for many years now. ASIKOS expands the phrase into "Just in time – but safety first". Legislation also demands compliance by the supplier with a host of regulations which are essential for safe transport. Loading regulations to ensure safe loads and weighing of trucks can cause delays in deliveries. In order to ensure delivery reliability, it is necessary for customers and suppliers to define the requirements of optimised logistics jointly and find individual solutions. For the generation of unique selling points in the form of a high degree of service can become a decisive competitive advantage. The service package is rounded off by the performance of disposal logistics. ASIKOS not only provides the safe and reliable delivery of abrasives of all kinds, but also the safe and reliable disposal of the used material. Over three decades of know-how, close contacts with customers and the associated familiarity with their wishes have made us not only a reliable manufacturer of abrasives, but also a reliable service provider.

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