

Coal inspection: good prospects for world-class performers

Current high price levels have attracted many new producers into the international trade and transport of coal, offering new opportunities for suppliers of sampling and inspection services and equipment, particularly in up-and-coming producer countries such as China, Russia, India, Vietnam and Indonesia (the latter being expected this year to become the world's number one steam coal exporter). Business is also brisk in the consuming countries such as Malaysia and Thailand.

This growth represents attractive new business for the inspection companies, and leading players have worked hard to extend their worldwide office networks.

BSI Inspectorate, for example, has, over the last decade or so, invested heavily in its Asian operations, opening new regional offices, particularly in China. Recognising the need for increased local support, the highly experienced Andy Skues was relocated in mid-2004 from the UK to the company's Asia regional hub in Singapore to oversee the growing coal business in the region.

Although the process is covered by international standards (eg ISO, ASTM),

Despite the increasing use of automated systems, there is a growing need for experienced personnel to oversee sampling and inspection operations, particularly in newer producer countries



Where it all starts, taking samples for inspection

coal and coke are amongst the most difficult bulk materials to sample and analyse because of their wide range of particle size and the variations in

the composition of individual pieces.

Although manual sampling continues to play a part in coal testing, the adoption of common standards has ushered in the increased use of automated testing systems and consumers in the power sector are investing in their own testing equipment.

Furthermore, many large coal terminals incorporate automated sampling plants into the handling system; these generally include a computer-controlled sample-cutting device that collects sample increments from a falling stream at systematic time or mass intervals.

But problems can occur in even the best automated sampling plants, for example when the remnants of previous cargoes are not fully cleaned from the system. Poor design and operating practices or lack of maintenance can even lead the sampling system to produce a biased sample, which will favour one party over the other.

Suspended magnet breaks record

China's Shenhua Coal Trading Company, established only ten years ago and already the leading supplier, recently ordered six Eriez Suspended Superconducting Electromagnets (SSE) worth around US\$5mill, the biggest single order in Eriez's history. Shenhua's ambition is to become the world's number one by the year 2010, and clearly an important element of realising this goal is to achieve "zero impurity" in coal exports.

To this end, Eriez was invited last year to participate in the bidding to supply a magnet that would meet their stringent separation requirements. Serious competition was encountered,



Eriez magnet installation in China

but Eriez felt it won through on the professionalism of its staff.

This order follows the successful installation of the world's first SSE Magnet at China National Coal's Qingdao

branch a few years ago. This was installed over a conveyor to attract and remove smaller and less magnetic ferrous metal contaminants, such as detonating caps, embedded within the coal burden.

The SSE has twice the strength of the most powerful conventional electromagnet ever produced for commercial purposes. And once ramped up the SSE requires only a trickle of power to maintain its very high magnetic field. This results in a significantly enhanced separation performance, particularly over high capacity conveyors, which is not possible on conventional suspended electromagnets. □

Ash probe performs well in frozen Siberia

The UK's Bretby Gammatech has just commissioned another of its ash probes, this time to the large Chernigovets opencast mine in Siberia, just north of the city of Kemerovo. The probe was successfully calibrated using small piles of pre-sampled coal of differing ash contents. Despite the freezing conditions - the temperature was never greater than -20°C - the probe was said to have performed well. The sale was made through Intertech and Sbytenergoprom, Bretby Gammatech's Moscow distributor.

Feedback just received from the mine indicates that the Ash Probe is being successfully used to measure the ash content of the raw coals prior to washing and blending which is already helping to improve quality control. Achieved accuracy against conventional samples is around 1% ash.

The ash probe is a hand portable instrument providing the user with a quick assessment of the coal piles' ash content. It is easy to use and displays accurate results within seconds. To obtain a reading, the probe is pushed into the pile to be tested. After a few seconds an ash result is shown on the display unit. In order to obtain an accurate assessment of the ash content of the whole pile (or wagon load), the probe is inserted at several locations. The probe provides a reading of the average ash for the whole pile along with individual readings for each probing.

There are no radioactive sources, as the probe uses natural gamma technology. It provides an average ash from up to 72 separate measurements from an individual pile, giving results from up to 72 different piles. Calibration is readily achieved by the customer using the supplied calibration sample gathering equipment, while the separate display unit can use up to nine separate calibrations for different coal types. Sales of the probe have been made to mines, blending plants and power stations in many countries around the world including the UK, Canada, Ukraine, China, Vietnam, Spain as well as Russia.



The ash probe works on a frozen coalpile in Russia

Now it has just received its first order from India, a country well known for its high ash content coal.

One case history that proves its value was when a power station in the Ukraine checked a coal supply coming in by train. Using the probe revealed a 40% ash content reading, well above the 16% ash coal that had been expected. The plant was able to stop the unloading and the consignment returned to the supplier. With usual testing methods, it would not have been possible to hold the train for the length of time conventional tests would have taken to show a result.

Bretby Gammatech does not claim to replace conventional analysis but argues that the probe can make available an instant reading from wherever the coal is situated at the time. Tests in a wide range of coals have shown that the instrument can measure the ash content to closer than 1% ash, and in some cases even 0.5% ash. This even applies to measuring the ash content of the raw coals prior to washing and blending to help improve quality control. Two of Bretby Gammatech's customers, both with a different applications, prompted the instrument's development. The first was a power station buying truckloads of coal from small mines, and the second was a blending plant with various coal types to produce a consistent power station mix. □

The design of some automated sampling plants forces the sample to drop several metres in height through the system, which can cause breakage of the coal and may affect the results of sizing tests.

The key to selecting a good representative sample is that all particles must have an equal probability of being selected by the sampling system. Depending on the particle size of the coal or coke, individual sample increments may be several kilograms, and a representative sampling programme may generate very large bulk samples (ie tonnes) for size analysis and quality testing.

"For these reasons," says Richard Downs, BSI Inspectorate's technical manager "it is vital that the independent inspector has comprehensive and relevant practical experience."

BSI aims to ensure that experienced professional personnel, correctly trained and supervised in the collection of coal and coke samples, are on hand to check sampling and weighing systems for appropriate calibration, design and cleanliness and to ensure that all the critical parts of the sampling system operate correctly as the sampling work is carried out.

Leading service provider, Luxcontrol, echoes this sentiment. Sales manager Herbert Ziebart stressed that by only employing qualified staff, the company can respond quickly, thus enhancing its reputation. "Although we are not the biggest sampling company, we think 'small' in terms of providing an individual service to clients. Being a compact organisation, we are able to respond more quickly to client queries," he said.

Ziebart noted that 50% of Luxcontrol's business is in coal, concentrated at Europe's ARA ports, with a laboratory actually situated on the EMO site in Rotterdam.

Another leading player, SGS, is using its significant technical experience to provide clients with the necessary evidence of the carbon content, calorific value and emission factor, according to Vincent Mazzone, Coal Business Manager.

Its Solid Fuels Laboratory in Antwerp has EN ISO 17025 accreditation, necessary in the light of the new EU Directive on greenhouse gas (GHG) emissions that is currently coming into force. This Directive

will require most industrial facilities in Europe to monitor and report their GHG emissions. They will be required to calculate the CO₂ emissions of their fuel (coal) even before burning it. This will therefore give rise to additional testing and the reporting of CO₂ emissions factors.

The monitoring and reporting provisions of Directive 2003/87/EC are designed to reduce emissions of greenhouse gases such as carbon dioxide. As of 1 January this year, all installations involved in the activities listed in Annex I of the Directive must possess the appropriate permit issued by a competent authority.

Where activity data for the calculation of process emissions cannot be measured directly, the data must be determined by an assessment of the stock before entering the process. In addition, the respective emission factor may only be used for the batch of fuel for which it was designated to represent. Any such regulation requires adequate supply of installed testing and sampling equipment at points of entry.

It is easy to forget that the bulk of coal



A sampling laboratory in the Far East

transportation in the world is not seaborne but on land. Here, testing quality on a per-truck or per-wagon basis is not only essential but also implies the use of more sampling kits.

The South African Bureau of Standards (SABS) has been providing sampling, analysis and certification services to South African and international buyers of South African export commodities for several decades through

its Coal and Minerals Technologies (CMT) division. A decision to promote the company under the CMT banner was taken a couple of years ago, but now the Bureau has decided to revert to the original SABS name for marketing purposes. Over the years the company has established a worldwide reputation for its integrity, expertise and accuracy.

Notably, SABS at Richards Bay Coal Terminal (RBCT) was the first coal laboratory worldwide to have achieved UKAS ISO 17025 accreditation for its laboratory and sampling systems. SABS operates several laboratories, strategically positioned around the country's coal centres as well as at RBCT - which ships over 70 mta of coal - and manages the sampling, analysis and certification both on its arrival at the terminal and again as it is shipped to buyers around the globe.

More than a billion tons of South African coal have been exported worldwide on the strength of SABS certificates, ensuring global acceptance of the brand as well as the integrity of the South African coal industry. □

Operating in all major **coal** and **coke** supplying and receiving countries, you can rely on our full range of **specialist** services including manual and mechanical sampling, draft surveys, vessel investigations, laboratory analysis and bias testing.



shape the future



UK HEAD OFFICE:
Tel +44 1376 515081
Email SteelEnergyCBT@inspectorate.co.uk

AMERICAS:
Tel +1 504 392 7660
Email Vic.King@inspectorate.com

ASIA:
Tel +65 6866 3018
Email Andy@bsi-inspectorate.com.sg

