



## Holcim Introduce Modern Processing Techniques to the Bulgarian Market

*When Holcim took ownership of Chepintsi quarry on the outskirts of Sofia in Bulgaria it was clear that in order to be able to maximise the potential offered at the site a complete re-evaluation of the extraction and processing system was required.*

Chepintsi was first opened in 1978 by Karierni Materiali and the original equipment was still in place when Holcim took over in 1998. The production manager for Holcim at Chepintsi is Ivan Slavov and he has been employed at the site since 1986. The original washing plant was of West German origin – this was particularly unusual in Eastern Europe during the cold war period. “Production was very inefficient with the old equipment that was on site” explains Ivan. “It was clear that this site offered significant potential that was currently not being realised.”

### The right business plan

In order to ensure that the new washing plant was entirely fit for purpose and would allow Holcim to maximise returns from Chepintsi, the company embarked on a project to clearly define the requirements of the new plant. This detailed business plan included details of the required capacity and final product specifications required as well as an analysis of how the desired results were best achieved. This process was led by Thomas Guillot, Director of Holcim Aggregate and Readymix division in Bulgaria.

“We worked very closely with Holcim Group Support in Zurich to develop the business plan for Chepintsi

in order to ensure that decisions we made in relation to the specification of the equipment offered a long term processing system which could adapt and change as markets dictate” explains Thomas.

The business plan had to integrate some key aspects of sustainable development and also had to take into account many site specific issues, both of which had an influence on the type of extraction and processing system that would be chosen.

As part of the Holcim commitment to sustainable development some important issues had to be considered. Health and safety and ease of extraction had to be at the core of the design considerations. Also, elements such as noise, visual pollution and dust emission were key in the choice of equipment. Finally the environmental foot print of the installation had to be minimized ensuring every ton extracted, even if low quality was able to be processed and sold rather than simply discarded.

The feed material at the Chepintsi site is dredged from the on site lake and this has been the case since production began in 1978. This is necessary as a high water table eliminates open pit as an option for extracting the raw material. The project to upgrade the processing plant at Chepintsi also included a plan to replace the existing dredging

plant which was seen by Holcim as being very inefficient.

Another issue at Chepintsi is the presence of very 'plastic' clay within the dredged material. The levels of clay vary as dredging is moved around the lake but at some points a significant amount of clay is present in the feed material. "We are dredging up to forty metres down and are dealing with a clay layer of approximately two metres in depth" explains Mathieu Provost, Process Performance Improvement and CAPEX manager. "Under this clay layer is where the good quality sand and gravel is to be found but we have to cut through the clay in order to expose it."

### Sand production requirements

Within the feed material for the CDE washing plant there is also a substantial proportion of minus 2mm material. This can be as high as 80% during some dredging operations but at all times this fine material represents a significant proportion of the material to be processed. The nature of the final product specifications for the sand material required by Holcim are governed by a number of factors, according to Thomas Guillot.

The first of these requires that the plant produce concrete sand which is sold to independent ready



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mix concrete manufacturers in the Sofia region who collect the material from site. Secondly, the high proportion of minus 2mm material in the raw feed presented an opportunity to produce a fine sand product for introduction to the market in Bulgaria. Given the perceived benefit to be gained from the introduction of this fine sand product, the specification of a system which could deliver the sand to a tight specification was very important for Holcim and this was emphasised in the development of the business plan from which the tender documents for the new washing plant were derived. "Through discussions with a number of potential customers for the fine sand product it became clear that if we could tighten up on the specification of sand there was huge potential" explains Thomas Guillot.

The potential in this instance comes from the fact that those potential customers for the fine sand product were currently faced with very high production costs. They were first required to screen the sand they were currently purchasing in order to remove the oversize material and also incurred very high energy costs as a result of having to dry the material at 800 degrees centigrade before it was suitable for introduction to their production process. As a result of being able to purchase sand that would be at the specification required for production they would significantly reduce their costs and as such provide Holcim with a niche market for this premium product. Holcim have identified a number of customers in a variety of industries for this fine sand product one of which is companies involved in the manufacture of adhesives for ceramic and natural stone tiles. "The ability to create this 0-1mm fine sand specification was a key requirement of this new washing and processing plant" says Mathieu Provost. "CDE scored highly on this element. They had the right solution."

Since the CDE washing plant has been introduced at Chepintsi further development work has been done to develop the specification of the fine sand produced by the processing plant. "Following commissioning of the original plant we opened discussions with several potential customers who required a 0-400 micron sand product" explains Thomas Guillot. "We have worked closely with CDE over the last few months to modify the existing plant set up to allow for production of this new very fine sand product and are very pleased that the sand is meeting the new specification. This presents us with a significant commercial opportunity for the introduction of this specialist sand to the Bulgarian market." The modifications to the existing Evowash sand washing plant involved the introduction of several CycScreen hydrocyclones to replace the

existing cyclone set up on the fine sand washing plant. This is a recent product development from CDE which facilitates the production of very fine sand specifications such as that required by Holcim. “The adaptability of the washing plant to cope with changes in our product requirements has been proven by the introduction of the new CycScreens” says Ivan Slavov. “The whole install and commissioning process took around three days with minimal effect on plant production. We are now set up to produce the 0-400 micron sand material which our research has shown will be a very important product for us going forward.”

The third influencing factor for sand and aggregate production at Chepintsi was the nature of material required by the infrastructure projects planned for Sofia. Given the proximity of the Chepintsi site to Bulgaria’s capital city, the requirements of the local construction market were very important in the specification of the processing plant for the site. A visit to the expanding city of Sofia demonstrates clearly that there is a significant amount of development work to be undertaken in the years to come. According to official statistics Sofia has a population of 1.25 million which represents one sixth of the population of Bulgaria. However, the National Statistical Institute of Bulgaria reported as recently as April 2010 that the actual population is significantly higher than this as the City has many residents who have not registered at City Hall. “The level of construction activity is down considerably from 2007 and 2008 levels” says Mathieu Provost. “There is a major redevelopment of the Sofia subway station taking place at the minute and we are supplying significant volumes of material to this project. A further recovery in the market is very dependent on commercial development coming back to life.”

### Variable feed material

While it is clear that a lot of research was done by Thomas Guillot and the Holcim team into the specific product specifications that they needed to achieve with this new processing plant, the nature of the feed material provided a considerable obstacle to this. While the material is of very good quality, there is a high level of variation from differing levels of highly plastic clay to extensive quantities of minus 2mm material in some areas of dredging. With this in mind, the capability of the system to adapt to these changes was crucial to ensuring that the washing plant delivered the required products.

The CDE washing plant installed at Chepintsi includes several component parts which ensure this requirement for adaptability can be met. The



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Evowash sand production system at Chepintsi is a combination of sumps, pumps and hydrocyclones which can be manipulated to ensure delivery of the final sand specification. “Given the variations in feed material an off-the-shelf sand washing plant was simply not an option” explains Ivan Slavov. “The CDE plant offered a high level of adaptability and this gave us comfort that our specific requirements in relation to product specification could be delivered. A key success here is the capability for us to easily manipulate the sand washing element if the sand becomes too coarse.”

The variations in the level of clay in the feed also presented a challenge. Following an analysis of the material at the CDE laboratory it was clear that in order to deal with the highest levels of plastic clay it would be necessary to include two RotoMax attrition systems in sequence to ensure the production of clean aggregates. The RotoMax system is a development of log washer technology which has been installed on many projects throughout the world by CDE. These vary from plants washing limestone contaminated with very high levels of plastic clay to numerous construction and demolition waste recycling plants. With the level of clay in the feed varying depending on the location of the dredger there would be occasions when the passing of material through the second RotoMax



had been granted for the Chepintsi site was another factor in the selection of who would provide the washing plant. “Modularity was key in our decision making process due to the requirement within the planning consent that there was an option to remove the plant from the Chepintsi site – essentially they wanted a portable rather than static plant” says Ivan Slavov. It was on these criteria that the product development work CDE have completed throughout their range paid particular dividends. “Since 2007 we have been working on all of the products within our range to create a suite of modular, skid framed components” explains Eoin Heron, CDE Export Sales Manager for Bulgaria. “This is not only a response to the increasing frequency of planning consents such as the one we were working with at Chepintsi. The ability to build up a plant as a combination of modular components minimises install and commissioning time, creates a universal suite of spares which are easily managed and makes plant access and maintenance easier. All of these things combine to reduce costs and increase plant efficiency.”

The 350 tonnes per hour washing plant at Chepintsi was commissioned in August 2009 one month ahead of schedule. Since then CDE have continued to work with Holcim on the training of site operatives and maintenance personnel. “Training of personnel is something that is very important for Holcim” said Thomas Guillot, “on this point we fitted perfectly with CDE. A detailed planning program covering not only the commissioning phase but also some post commissioning review and maintenance procedures was included in the initial offer of CDE.” This training

would be sufficient. The plant therefore includes a facility whereby the first RotoMax can be by-passed as and when required. “We first treat the material on the dredge which allows us to remove the very large lumps of clay” explains Mathieu Provost. “This reduces the pressure on the washing plant and also means that we are not increasing the required capacity of the 1 kilometre land conveyor and the washing plant simply to transport waste material.”

In order to by-pass the first RotoMax the 4mm – 45mm material from the ProGrade rinsing screens is first delivered to the AtroFeed attrition system before being delivered to the RotoMax. The AtroFeed unit provides an initial level of attrition to the material by subjecting it to high pressure water jets and the slurried material is then pumped to the RotoMax system. It is only through the introduction of the AtroFeed that the option to by-pass the first RotoMax can be realised. If the material was to be conveyed to the RotoMax attrition phase this option would not have been available to Holcim. An additional benefit of the AtroFeed unit is the reduced space required on site to accommodate the plant. The delivery of material via pipework instead of a conventional conveyor significantly reduces the footprint of the Chepintsi plant. “The reason for the selection of CDE to provide the washing plant at Chepintsi was basically in response to their approach to the process and a demonstration of a new approach to materials handling” says Mathieu Provost. “It was a very compact plant when compared to others we had looked at which was a major advantage.”

### Overcoming planning requirements

The nature of the planning permission that Holcim



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has been particularly well received by Production manager, Ivan Slavov, who believes that employees at the site must take ownership of the plant and understand their individual contribution to ensuring productivity and efficiency are maintained. “We fully understand our own role and responsibilities in relation to the ongoing maintenance of this new washing plant” Ivan explains. “The preventive maintenance regime that CDE recommended is already demonstrating quantifiable benefits and their commitment to training our people has been excellent.”

The successful delivery of the Chepintsi plant for Holcim is largely due to the successful implementation of CDE’s ProMan methodology which sees an individual project manager assigned to the job as soon as it goes live. This project manager is then identified as the single point of contact between the customer and CDE and his responsibilities are many and varied, including being in control of the design team in the first instance to ensure all deadlines are met as well as taking responsibility for the manufacturing process, all health and safety issues, on site install and commissioning and logistics. A key function of this role is to deliver all CDE projects on time and on budget and the delivery of the Chepintsi plant one month ahead of schedule is an example of the kind of results being enjoyed by CDE since the full implementation of the ProMan system. “The ProMan methodology allows us to ensure that our plant is up and running as soon as possible and is based around the ownership principle” explains CDE Operations manager, Ray Cooke. “The responsibility for every aspect of all the projects we work on lies with the individual project manager.”

Speaking about the final delivery of the Chapintsi Project, Thomas Gullot says “CDE came to the

party late on in the tender process and had much less time to submit their proposal than the others. Despite this their whole approach impressed us. They didn’t just deliver on our basic requirements. They focused on maximising efficiency, making access and maintenance easy and ensuring very high health and safety standards. They presented a modern vision of how projects like this should be managed.”

### Effective plant management

While the new plant at Chepintsi is delivering good results for Holcim in Bulgaria Thomas also highlights the fact that other sites operating very old equipment have seen considerable improvements due to the plant management approach that the Holcim team in Bulgaria have taken in recent years. “It is only through detailed research into the factors that will govern plant success, the selection of the right partners to work with on specific projects and a continuing focus on process improvement that you can realise the full potential of any operation” says Thomas. “This is a mix that we have got right at Chepintsi.”

Holcim was founded in Switzerland in 1912 and is one of the world’s leading suppliers of cement and aggregates. The company also supplies ready mix concrete and asphalt and provides related services. Holcim employs 80,000 people worldwide with production sites in around seventy countries and a market presence on every continent.

For further information on the range of washing equipment and turnkey washing plants available from CDE visit their web site at [www.cdeglobal.com](http://www.cdeglobal.com). You can view a library of previous project images at [www.flickr.com/cdeimages](http://www.flickr.com/cdeimages) and view videos of their washing plants and equipment in operation at [www.youtube.com/cdeirelandtv](http://www.youtube.com/cdeirelandtv). You can also keep up to date with the latest goings on by following them on Twitter. Simply visit [www.twitter.com/cdeglobal](http://www.twitter.com/cdeglobal) to view their profile and sign up for automatic updates on new projects, product launches and global events at which they will be present.

