

Line clear for ICE

On 16.11.2009, the renewed track section between Fürstenberg and Dannenwalde on the Berlin-Rostock railway line was officially handed over. For this project, CEMEX Kies & Splitt GmbH, a subsidiary of CEMEX Deutschland AG, supplied around 50 000 t mineral materials as ordered by the contractor, the SPITZKE AG group. The company also took care of the proper disposal of the unstable rail track substructure.

Presumably by the year 2015, Deutsche Bahn will reconstruct the over 200-km-long Berlin-Rostock twin-track railway line to take train speeds up to 160 km/h. The journey time is to be reduced to less than two hours. Contracted by Deutsche Bahn AG, SPITZKE AG has provided an extensive package of services since December 2008. Main component of the line upgrade was track renewal in both directions of travel, each with a length of 13.6 km between Dannenwalde and Fürstenberg. In addition, two bridges were refurbished and the platform at Dannenwalde station was renewed. SPITZKE AG entrusted CEMEX Kies & Splitt GmbH with the supply and disposal of a total of 150 000 t of mineral aggregate for renewal of the track, specifically for the installation of a new formation protective layer (FPL) and the

disposal of non-stable track substructure. The building materials were supplied by CEMEX-Kieswerk Kraatz in the district of Oberhavel in Brandenburg. The spent materials were disposed of in cooperation with specialist disposal companies based locally.

The layer under the ballast bed no longer met the requirements for the new line (160 km/h). It was removed and replaced with a stable formation protective layer, which was produced to the specifications of DB AG in compliance with its TL 918 062 at Kraatz Gravel Works (grain blends 1 and 2). CEMEX Kies & Splitt attached special importance to the regular monitoring of the material quality to meet the demanding customer requirements. The formation is a surface produced with an incline, which supports the track bed structure. The FPL is the supporting layer between the subgrade and the ballast bed. On the one hand, it helps distribute the load, and on the other it is useful for the drainage of the surface water to the sides.

Track construction was completed with the special RPM-RS-900 tracklaying machine from SPITZKE, which is also known as Catherine the Great (Fig. 1). The machine is just under 200 m long and combines various functions that previously could only be performed separately: cleaning and recycling of the ballast and the upgrading or renewal of the protective sub-layer. In front of and behind this are material conveyor and silo wagons, which are used to take away the spent materials and supply the new materials. The excavating machine is the core component of this huge machine. It lifts the rail tracks together with the sleepers. By means of two chains, the track ballast and then the old base layer under the tracks is brought out and removed on a belt conveyor. On other belt conveyors, the materials for the new FPL are



(Photo: SPITZKE AG)

1 RPM-RS-900 track-laying machine: "Catherine the Great"



(Photo: SPITZKE AG)

2 Renewal of the FPL over a length of just under 14 km



(Photo: CEMEX Deutschland AG)

3 The track laying machine renews 150 m of track per hour

heaped onto the subgrade and rolled (Fig. 2). The track and sleepers are removed, the cleaned ballast added and compacted with a tamping machine. The expensive track laying machine, which costs several million €, is in action around the clock so that it can be operated cost efficiently. In an hour, the around 30 men who operate the machine can manage up to construct 150 m of track (Fig. 3).

This presented Cemex with a great logistics challenge: the materials produced were always stored in sufficient quantities, so that it could be transported by lorry to the different stock-

yards of the line sections whenever called for. From these yards, the just under 200-m-long RPM-RS-900 takes the material to use it in the track structure. On its return route, the machine transported up to 5 000 t per day of the removed material to the storage yards. CEMEX Kies & Splitt then took this material for professional disposal. On many days, 30 lorries were in operation at the same time.

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ABSTRACTS

Settling velocities of particulate systems 15:
Velocities in turbulent Newtonian flows

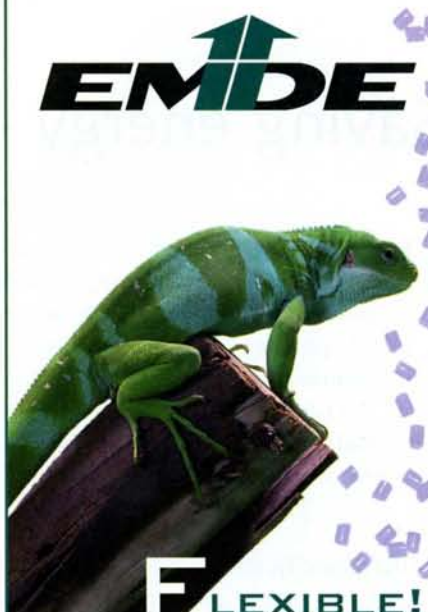
The success in obtaining closed form solutions to the sedimentation of individual particles and to the suspensions of particles in fluids motivated the application of the same procedure to the turbulent flow of Newtonian fluids in conduits. The purpose of this paper is to present explicit equations for the Fanning friction factor and of the average velocity of a Newtonian fluid in a cylindrical tube, for any value of Reynolds number and dimensionless roughness. Several explicit equations have been proposed to avoid the iterative procedure. Unfortunately these correlations give the friction factor in terms of Reynolds number and therefore, if the flowrate in the pipe is unknown in advance, iterative procedure will again be necessary. The definition of a dimensionless pipe diameter and a dimensional fluid velocity permits the avoidance of iteration by making exact calculations with respect to the Colebrook equation. Hf

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Structural changes in olivine (Mg, Fe)₂SiO₄
mechanically activated in high energy mills

The study evaluates the structural changes in olivine (93 % forsterite – Mg₂SiO₄ and 7% fayalite – Fe₂SiO₄) generated by mechanical activation by the use of different types of grinding mills with high energy input such as a planetary and an attrition mill (laboratory scale) as well as an industrial nutating mill (Hicom 15). To identify mechanically induced changes in the mineral the physico-chemical properties were studied. Products of grinding were characterized by scanning electron microscopy, X-ray diffraction (XRD), specific surfaces area measurement and infrared spectroscopy techniques. The physico-chemical changes illustrate the possibility of modifying the surface and/or volume properties of olivine depending on the activation mode applied. Milling in the wet mode show the higher values of specific area, whereas the dry mode results in a stronger distortion of crystal lattice, especially with a reduction of peak intensity of olivine in the XRD pattern. Hf

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