

Utilization of the waste and its mixtures in the technical land reclamation

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Abstract

Effects of the black coal underground mining are manifested in the mining landscape of the Ostrava-Karviná region in the form of earth's ground deformations being accompanied by the deformations of all the way to the destruction of the surface structures. To deal with the black coal underground mining consequences it is necessary to provide the enormous volumes of the filling materials, especially in places where the waste rock and tailings from the preparation processes are short.

The utilization of the waste for the technical land reclamation is decided in the individual localities and based on the local risks as well as the legislative restrictions (the requirements for the harmful substance contents in the waste, which may be used on the ground surface, are specified in the Decree No. 294/2005 Coll. on conditions for the waste disposal in the waste disposal sites and its utilization on the ground surface, as amended by the Decree No. 383/2001 Coll., on details for the waste handling).

Therefore, firstly there is necessary to identify the own waste or waste mixtures with following laboratory and pilot tests. Only then, it is possible to determine, whether the waste may be applied in the locality in question for the technical land reclamation purposes.

Out of the range of the waste possibly suitable for the use on the ground surface, the choice of samples of "future" filling materials was narrowed to three available commodities: waste from the metallurgical primary production (blast-furnace slag), waste from the power-engineering (fluid fly ash, fly ash stabilisate), and waste from the chemical industry (production of titanium white).

First, the waste samples underwent the laboratory analyses and pilot tests. The objective was to prepare such

mixtures of materials which could be used in the deposition on the ground surface or could be certified as materials suitable for technical land reclamation.

The following waste mixtures were prepared: Prestab + fly ash, Prestab + fly ash + slag, slag + Prestab, fly ash + slag, Prestab + fly ash stabilisate. In total, in the laboratory 41 samples of different mixtures of the above mentioned waste types were prepared. Gradually, all the proportions were mixed using a CAT M318 machine. After mixing, the individual figures of the inert material of about 1.5 m were formed. Such prepared, mixed volumes underwent a travel compaction experiment using a CAT D6H dozer.

Pilot tests helped to recommend a mixture of the slag and Prestab in the proportion 1.5 : 1 and a mixture of Prestab + fly ash stabilisate in the proportion 1 : 1.5. Using the proportions in question, the mixtures appear as no problem both in terms of handling as well as suitability for deposition on the ground surface within remediation and land reclamation work.

On the grounds of the laboratory analyses, only the mixture of Prestab and fly ash stabilisate can be recommended as it complied with the top admissible harmful substance concentrations in the waste solids in accordance with Appendix No. 10 to Decree No. 294/2005 Coll. Only in that case it is possible to consider certification of the mixture as a filling material for the land reclamation. Receiving a certificate should contribute to a simplification of the preparatory phase of ground shaping and remediation constructions.

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