



Options for the remediation of embankment dams using suitable types of alternative raw materials



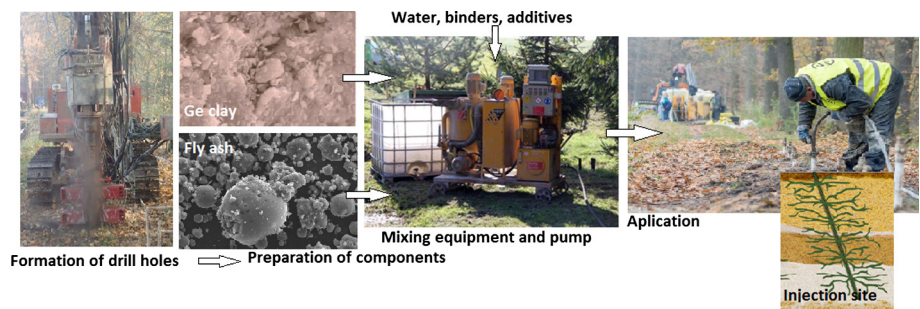
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HIGHLIGHTS

- Unique technology for the remediation of the damaged embankment dam.
- Using fly ashes for improve the properties of mixture.
- Partial replacement of clay by fly ash.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:

Received 11 February 2016
Received in revised form 2 February 2017
Accepted 14 February 2017

Keywords:

Embankment dams
Grouting
Clay
Lime
Cement
Fly ash
Secondary raw materials

ABSTRACT

At the earth dams, malfunctions, leaks and loss of stability can occur during use. Chemical grouting of the dams is one of the repair options. It is possible to use fly ash within this technology. The use of fly ash in the grout significantly improves the rheological properties of the mixture, reduces costs to repair and also fulfils environmental requirements. It has been shown that, thanks to a suitable granulometry and mineralogical composition of the fly ash, using it in the grout can partially replace clay, which is a base material, while maintaining the technical characteristics of the mixture.

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Specifications Table

Subject area	Civil engineering
More specific subject area	Effect of grout on remediation embankment dams
Type of data	Tables, images, graphs, figures
How data was acquired	X-ray analysis, chemical analysis, granulometry, viscosity analysis, compressive strength analysis
Data format	Analysed, measured
Experimental factors	Samples for determination of granulometry of clay, samples of raw materials (ash and clay) for chemical analysis, samples of designed mixtures for determination tests in fresh and hardened state
Experimental features	Granulometry was determined on samples of Ge clay (according to EN ISO 14688-1, EN ISO 14688-2). Yield value was determined by the so-called "Vasiliev" cone (according to CEN ISO/TS 1789-12). For determination of viscosity a Marsh viscometer was used, which has the shape of a cone (according to EN 12 715). The compressive strength was tested on cubes 100 × 100 × 100 mm, after 28 days (according to CEN ISO/TS 17892-7)
Data source location	Brno, Czech Republic, The Cheb basin
Data accessibility	Hydro-physical properties of Ge clay, mineralogical composition of Ge clay were earn from book Sokolář, et al., 2012, other all data were obtained within the own measurement

- From this viewpoint, it is a technology that can, as compared with traditional technologies using a clay-cement mixture, reduce the cost of remediation dikes by at least 20%.

1. Introduction

Embankment dams are one of the simplest types of water works. In terms of frequency, they are present in the largest scale. In most cases there are dams of small water works, such as ponds, ameliorative reservoirs, etc. These dams can develop tensile cracks, which are caused by age and by uneven subsidence. Tensile cracks may be created in the alumina and sealing core in a homogeneous dam, which can result in leaks. Seepage may have disastrous consequences that may become apparent over a period of weeks or months [1]. Such consequences mostly occur during catastrophic floods, which represent one of the greatest direct dangers for Europe. For this reason it is important to carefully monitor and maintain the structural integrity of dams. One possible corrective intervention for these dams is rebuilding. Rebuilding necessitates the investment of considerable amounts of time, money and tech-



Fig. 2. Drilling equipment of traditional injection [authors].

Value of the data

- In connection with the environment, we can solve problems when our landscape is losing its natural ability to retain water.
- From the viewpoint of support functions of the landscape, it is a unique technology that would contribute to the retention of water leaking from the dam.
- The technology may be used for the rehabilitation of the existing water works, with minimal cost, space and time consumption.
- Reduction of economic terms can be achieved by replacing classic materials, which is clay in this case, by using alternative raw materials, mainly ash.

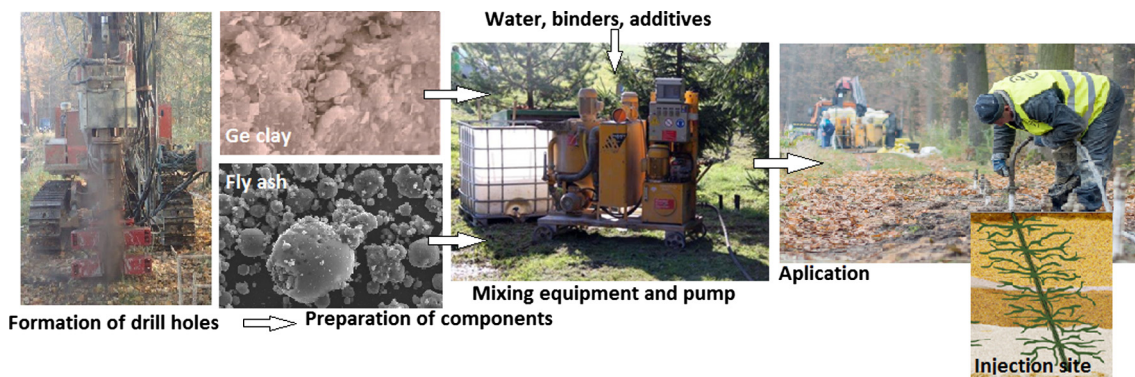


Fig. 1. Diagram of research repair dams by using grouting procedure and practical application.

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