# Peat Consolidation with Bottom Ash - Theory and Practice

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ABSTRACT:

In the Zachodniopomorskie Province (Poland) many reclamation and macro-levelling processes have been carried out in the last 12 years, with the use of nearly two million tons of fly ash. The area intended for levelling is located on the eastern side of Nad Odrą Street in Szczecin, between the Skolwin Paper Factory and Szczecin Steelworks. The existing ordinate of the ground ranged from 0.4 m in the western part to 1.5 – 2.0 m above sea level in the southern part. The geotechnical division of the substrate soil is the following: layer I– peat, (weaker), layer Ia – peat (stronger), layer II– organic mud (weaker), layer IIa – organic mud (stronger). Any industrial development of Odra river areas is possible only by preparation of the ground, which can be cheaper when fly ash is used. Nad Odrą Street due to the possible assigning of the land for industrial purposes, it is designed to fill the levelled ground with fly ash and slag mixture while keeping to the following conditions: filling gradually of the natural ground depression with fly ash and slag mixture in separately compacted layers, next forming of the ground surface (covering layer) and finally preparation of the ground for future industrial development. According to the design assumptions, mainly fly ash and slag mixture from Dolna Odra Power Plant in Nowe Czarnowo are to be used for levelling works. Water conditions are related to the geologic structure of substrate and water level in the adjacent channels and the Odra river. The basic water-bearing strata are river sand and glacial-water sand underlying the organic strata. The ash and slag mixture has been placed since August 2004 in 0.5 m thick layers, except for the first bottom layer that was up to 2.0 m thick.
Based on the analysis of the test results reached in December 2004, it appears that in the test points, upon incorporation of fly ash and slag mixture and improvement of the ground with a layer of 2 – 3 m, the organic soil got partially consolidated within the short period of 4 months. The limit pressure $p_l$ grew by approx. 7 – 35%, while the growth of the pressure meter modulus value ($E_M$) reaches 10 – 16%. Compressible organic soils are characterised with a long period of full consolidation. Completion of the process of consolidation will not occur earlier than after several tens of years.

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