Research of Wood and Oil Shale Ash Utilisation

Kaukulis, Martins (School: Valka Janis Cimze Gymnasium)
Baumanis, Rudolfs (School: Valka Janis Cimze Gymnasium)

Nowadays, a dry hydraulic mixture, such as cement is one of the common building materials, thus reducing production cost and minimizing negative environmental impact is a high priority for cement production industry. Use of oil shale and wood in energy systems involves the formation of large amounts of waste and the subsequent environmental impact – air pollution, water pollution etc. Furthermore, producing of portland cement consumes a large amount of energy, resulting in a significant amount of greenhouse gases in the atmosphere. The negative impact on the environment is why nature-friendly disposal and reduction of greenhouse gases are important. To reduce the carbon emissions of the cement industry, attention is focused on pozzolanic materials with a view to at least partially replace cement. This project explored the possibility of utilization of various industrial by-products - slag, as pozzolan - in the production of dry hydraulic mixtures with a purpose of reducing cement consumption in the product. We have measured mechanical and physical properties and structural changes of the concrete obtained from the dry hydraulic mixtures with different pozzolanic additives originating from industrial waste. Results show that adding Narva powerplant electrostatic precipitator slag to cement mass reinforces concrete matrix strength. Hence such oil shale slag could be potentially used in cement production. This open up a business opportunities for regional cooperation in reducing environmental pollution in cost-effective manner, particular, transnational synergy between Latvian cement producer “Cemex” in Broceni and Estonian oil shale power plant in Narva.

Awards Won: