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Using bottom ash from the domestic waste incinerator to make building materials

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Abstract

This paper researched the use of ash from domestic waste incinerators to generate electricity and blast furnace slag for civil construction materials. Due to the presence of heavy metal elements in the ash from the domestic waste incinerator and the blast furnace slag, its use is limited. This study focused on the field of manufacturing adhesive materials based on the ash from the incinerator for power generation and blast furnace slag by activated alkaline solution and investigating the heavy metal migration into the environment. The study showed that the compressive strength of the adhesive from the ash of the electric generating incinerator - blast furnace slag (BFS) activated by alkaline solution had a compressive strength 19.98 MPa when cured at normal conditions. Ash from domestic waste incinerator (DWS) - BFS binder activated alkaline had the ability to fix heavy metals and can be used in construction works.

Keywords

Blast furnace slag; ash from the domestic waste incinerator; activated alkaline solution; compressive strength

References

- J. Davidovits. Geopolymers: Inorganic Polymeric New Materials, J. Therm. Anal. Calorim., 1991, 37(8), 1633- 1656. doi:10.1007/BF01912193
- P. Chindaprasirt, U. Rattanasak. Fire-resistant geopolymer bricks synthesized from high-calcium fly ash with outdoor heat exposure. Clean Technol. Environ., 2018, 20(5), 1097-1103. doi:10.1007/s10098-018-1532-4
- C. Sreenivasulu, A. Ramakrishnaiah, J. G. Jawahar. Mechanical properties of geopolymer concrete using granite slurry as sand replacement. Int. J. Adv. Res. Technol., 2015, 8(2), 83. ISSN: 22311963
- M. Shriram, Pushparaj, N. Ravikiran. Laboratory investigation on the strength and durability characteristics of geopolymer concrete, Inter. J. Innov. Res. Sci., Eng. Technol., 2016, 9(5), 2347-6710. doi:10.15680/IJIRSET.2016.0505649
- T. M. Ngo, Q. L. Bui. Study the nature, component and proposal how to use ash form domestic waste by burner generate, J. Wat. Res. Environ. Eng., 2015, 48(3), 50-56.
- L. Yiquan, Z. Weiping, Y. En-Hua. Alkali-activated ground granulated blast-furnace slag incorporating incinerator fly ash as a potential binder, Construc. Build. Mater., 2016, 112, 1005-1012. doi:10.1016/j.conbuildmat.2016.02.153
- R. Forteza, M. Far, C. Segui, V. Cerda ´. Characterization of bottom ash in municipal solid waste incinerators for its use in road base, Waste Manage., 2004,

24, 899-909. <https://doi.org/10.1016/j.wasman.2004.07.004>

X. Gao, W. Wang, T. Ye, F. Wang, Y. Lan. Utilization of washed MSWI fly ash as partial cement substitute with the addition of dithiocarbamic chelate, *J. Environ. Manage.*, 2008, 88, 293-299. <https://doi.org/10.1016/j.jenvman.2007.02.008>

Z. Cong, Y. Lyu, D. Wang, Y. Ju, X. Shang, L. Li. Application of Fly Ash and Slag Generated by Incineration of Municipal Solid Waste in Concrete, *Adv. Mater. Sci. Engineer.*, 2020, 6, 1-7. <https://doi.org/10.1155/2020/7802103>

P. Wang, Y. Hu, H. Cheng. Municipal solid waste (MSW) incineration fly ash as an important source of heavy metal pollution in China., *Environ. Pollut.*, 2019, 252, 461-475. <https://doi.org/10.1016/j.envpol.2019.04.082>

J. Pera, L. Coutaz, J. Ambroise, M. Chababbet, Use of incinerator bottom ash in concrete, *Cem. Concr. Res.*, 1997, 27, 1-5. [https://doi.org/10.1016/S0008-8846\(96\)00193-7](https://doi.org/10.1016/S0008-8846(96)00193-7)

M. A. Cinquepalmi, T. Mangialardi, L. Panei, A. E. Paolini, L. Piga, Reuse of cement-solidified municipal incinerator fly ash in cement mortars: Physico-mechanical and leaching characteristics, *J. Hazard. Mater.*, 2008, 151, 585-593. <https://doi.org/10.1016/j.jhazmat.2007.06.026>

B. Vijaya Rangan. Geopolymer concrete for environmental protection, Fly Ash-Based Geopolymer Concrete, *T. Indi. Concr. J.*, 2014, 88(4), 41-48.

S. D. Partha, N. Pradip, K. S. Prabir. The effects of ground granulated blast-furnace slag blending with fly ash and activator content on the workability and strength properties of geopolymer concrete cured at ambient temperature, *Mater. Des.*, 2014, 62, 32-39. <https://doi.org/10.1016/j.matdes.2014.05.001>

J. Thaarrini, R. Venkatasubramani. Properties of Foundry Sand, Ground Granulated Blast Furnace Slag and Bottom Ash Based Geopolymers under Ambient Conditions, *Period. Polytech. Civ. Engineer.*, 2016, 60(2), 159-168. <https://doi.org/10.3311/PPci.8014>

N. Ganapati, A. S. S. N. Prasad, S. Adishesu, P. V. V. Satayanaray. A study on strength properties of Geopolymer Concrete with the addition of GGBS, *Inter. J. Engineer. Res. Develop. (IJERD)*, 2012, 4(2), 19-28.

QCVN 40:2011/BTNMT. Ministry of Natural Resources and Environment, 2011.

M. Izquierdo, E. Vazquez, X. Querol, M. Barra, Á. Lópezl, F. Planna. Use of bottom ash from municipal solid waste incineration as a road material, *Inter. Ash Utiliz. Sympos. Cent. Appl. Ener. Res.*, University of Kentucky, 2001, 3-7.

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