



Uporaba antropogenih pepelov v tehnologijah priprave cementa in betona

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Utilization of anthropogenic ashes in cement and concrete technology

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Povzetek

V članku je podan pregled uporabe pepelov, nastalih v različnih procesih dejavnosti človeka, v tehnoloških aplikacijah priprave cementa in betona s konkretnimi primeri. Na primeru premogovega pepela, z dobro znanim elektrofilterskim (EF) pepelom kot preizkušeno tehnologijo, je podan primer reaktivnosti pepela/žlindre kot tudi pepela odvzetega na staren jalovišču pepela. Obravnavane so možnosti in omejitve glede uporabe pepela iz sežigalnic komunalnih odpadkov. Prav tako je izdelana primerjava različnih pepelov iz termične obdelave biomase, npr. lesa, riževih lupin, sladkornega trsa in pšenične slame. Prikazane so sinergijske reakcije med karbonati in aluminati iz pepelov, dodanih v cement in beton, ki vodijo k izboljšanju trdnostnih parametrov. V članku je prav tako dokumentiran pozitiven vpliv mešanja mikrosilike in npr. pepela v trikomponentne betonske mešanice.

Ključne besede: antropogeni pepeli, pepel, cement, beton, trikomponentne mešanice.

Abstract

The utilization of man-made ashes in cement and concrete technological applications are reviewed and specific examples are given. In the case of coal ash with well-known fly ash as mature technology, examples are given on the reactivity of bottom ash as well as pond ash taken from old deposits. The possibilities and limitations of utilizing municipal solid waste incineration (MSWI) ash are elucidated. Ashes of biomass like wood, rice husk, bagasse and wheat straw are compared and discussed as well. Synergic reactions between carbonate and aluminate from ashes blended in cement and concrete leading to enhanced strength are demonstrated. Furthermore, the beneficial effect of combining silica fume with for instance bottom ash in ternary blends is documented.

Key words: anthropogenic ashes, bottom ash, cement, concrete, ternary blends.