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Editorial

Construction and building materials

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1. Introduction and scope

Construction materials and related technologies represent a quite interesting wide field from scientific, technological and commercial perspectives. They include metal reinforcement, bricks and mortars, masonry, timber, steels (common and stainless steels), polymers, composite fibers green materials, recycled materials. The scope of the special issue includes, but is not restricted to, new constructions and repair & reinforcement of civil engineering structures, infrastructures, silos, highway pavements, tunnels, water containment structures, sewers, bridges. The scope of this special issue embraces interdisciplinary work covering materials science and technological aspects, reporting about experimental and theoretical progress concerning materials microstructure, microstructure–properties relations, microstructure–applications relations.

2. Contributions

The special issue collects manuscripts from academic and industrial researchers with stimulating new ideas and original results coming from scientists in Croatia, Italy, Japan, Russia, Malaysia, Norway, Pakistan and Russia so showing how such topic is diffused worldwide. The special issue consists of six research papers. Jandrlić et al. [1] propose a new mathematical model for calculation of stresses on the basis of experimentally measured values of strains and temperature changes for niobium micro-alloyed steel. Construction of model was done using a multiple regression analysis of the measured values of temperature change, deformation and stresses at four different stretching rates. All investigations were conducted on samples from the niobium micro-

alloyed steel, using thermography and digital image correlation during static tensile testing. The model was tested and validated on the experimentally obtained results. Model showed a good agreement of calculated stress values with experimentally obtained ones. Di Schino [2] presents a new super-ferritic stainless steels family: these steels are characterized by a micro-structure and properties similar to those of more common ferritic alloys, with the advantage of higher chromium (Cr) and molybdenum (Mo) levels aimed to increase resistance at high temperature and corrosion behavior in aggressive environments, such as seawater. The research focuses on the corrosion behavior of recently developed super-ferritic stainless steels. Such steels are characterized by a Cr content ranging between 21% to 24% and very low carbon and nitrogen levels (C + N < 0.015%). Moreover, low nickel (Ni) and Mo contents are adopted in such steels, following to the high costs of such elements. Ogawa et al. [3] reported about the tensile properties of ferrite single-phase low-carbon steel with different initial microstructures were evaluated. Three types of hot-rolled sheet specimens with different microstructure were used. Results suggest that the homogeneous distribution of cementite and the fine recrystallized ferrite grains in specimen M suppress void coalescence, thereby resulting in a good balance between the tensile strength and the local elongation. Gtnokow et al. report about correlation of the chemical composition, structure and mechanical properties of basalt continuous fibers [4]. They present the Basalt Continuous Fibers (BCF) tensile strength dependence on their chemical composition. 14 different basalt deposits were used to obtain continuous fibers by a laboratory scale system. Based on the data for more than 15 articles focused on natural basalt continuous fibers (32 different compositions) and experimental data of 14 experimental BCF series, the correlation of the tensile strength, the acid modulus and the NBO/T parameter was calculated. The PCC (Pearson Correlation Coefficient) value of NBO/T and the tensile strength was 0.79, for acidity modulus and tensile strength. Raman data for experimental BCF confirm the significant influence of the chemical composition of basalts on their structure, which determines their tensile strength. With a decrease in NBO/T, the observed ratio between the Raman bands at low- and high- frequencies gradually increases. Thorstensen [5] reports about Preventing early age chloride migration into low-carbon concrete. Results indicate a potential for reducing chloride penetration with efficiency up to 90%, depending on the exposure regime and the maturity level of the concrete and the hydro-phobic paint. Ahmad et al. [6] report about mechanical properties of hot-mix asphalt using waste crumber rubber and phenol formaldehyde polymer. The authors demonstrate that crumb rubber and bakelite has potential to enhance the mechanical properties and between them Bakelite shows better result in term of higher strength and stiffness.

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Conflict of interests

There is not any conflict of interests between authors.

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