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COMPARATIVE STUDY OF POLYMER CONCRETES WITH VARIOUS FLY ASHES

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Summary. *In the era of sustainable development the common trends are rationalizing the use of natural sources, energy and work, and developing new pro-ecological technologies that enable reducing level of pollution, minimizing consumption of raw materials and on the other hand increasing the waste products recycling. For this reason, much emphasis is placed on developing ways of industrial wastes and by-products disposing into building materials, especially in cement concretes, but recently also in polymer concrete technology.*

Polymer concretes (PC) are the concrete-like composites, where the cement binder is replaced with a resin binder. Because of their main advantages – very good mechanical properties and high chemical resistance – polymer concretes are considered as high-performance materials. The most important PC applications include the production of pre-cast elements, tanks for chemically aggressive liquids (e.g. electroplating baths), facade elements (e.g. tiles, solar panels), parts of electrical insulation (e.g. HV insulators, bushings, transformer enclosures), the corrosion protection of concrete structures, etc. However the main obstacle against the wide use of polymer concrete is its high material cost, resulting from the application of high quality components. One of the ways of reducing the material cost is replacing expensive components with cheaper equivalents, including waste products.

In the paper the results of several studies concerning polymer concretes containing fly ashes, the by-products of coal combustion were compared. The concretes (including polyester, vinylester and epoxy concretes) contained fly ashes of various types, origin, combustion technology and chemical composition. The considered data were the results of studies available in literature as well as results of own research study. The influence of fly ash type and content on PC's mechanical properties, such as compressive strength, flexural strength and tensile strength but also on chemical resistance were investigated and analyzed. Special attention was given to the fact that fly ashes from conventional beds and fly ashes of high

calcium oxide content from fluidized bed combustion – FBC (also referred to as calcium fly ashes) differ in many aspects which translates later into polymer concrete properties. Moreover fly ashes were compared against the material often applied as an very fine-grained filler to concrete-like polymer composites, the raw substance – quartzite meal.