Mechanical properties and durability of crumb rubber concrete

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Abstract. This paper is focused on concrete with admixture of rubber powder, generally called crumb rubber concrete (CRC). The inspiration was found in Arizona, where one of the first CRCs has been created. However, Arizona has completely different climates than Central Europe. Could we use the crumb rubber concrete on construction applications in the Central European climate too? The paper evaluates the influence of the rubber powder on material characteristics and durability of CRC. CRCs with various contents of fine and coarse crumb powder were compared. The tested parameters were slump, air content, permeability, resistance of concrete to water with deicing chemicals, compressive and splitting tensile strength. The tests showed that workability, compressive strength and permeability decreased as the amount of rubber increased, but the air content increased as the rubber content increased. Photos of air voids in cement matrix from electron microscope were captured. The results of laboratory tests showed that admixture of rubber powder in concrete could have a positive impact on durability of concrete and concurrently contribute to sustainable development. Considering the lower compressive strength, CRC is recommended for use in applications where the high strength of concrete is not required.