Influence of increasing amount of recycled concrete powder on mechanical properties of cement paste

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Abstract. This paper deals with using fine recycled concrete powder in cement composites as micro-filler and partial cement replacement. Binder properties of recycled concrete powder are given by exposed non-hydrated cement grains, which can hydrate again and in small amount replace cement or improve some mechanical properties. Concrete powder used in the experiments was obtained from old railway sleepers. Infrastructure offer more sources of old concrete and they can be recycled directly on building site and used again. Experimental part of this paper focuses on influence of increasing amount of concrete powder on mechanical properties of cement paste. Bulk density, shrinkage, dynamic Young's modulus, compression and flexural strength are observed during research. This will help to determine limiting amount of concrete powder when decrease of mechanical properties outweighs the benefits of cement replacement. The shrinkage, dynamic Young's modulus and flexural strength of samples with 20 to 30 wt. % of concrete powder are comparable with reference cement paste or even better. Negative effect of concrete powder mainly influenced the compression strength. Only a 10 % cement replacement reduced compression strength by about 25 % and further decrease was almost linear.