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Long-term micro-Deval durability of andesite aggregate

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Micro-Deval tests have been intensively used for analysing aggregate durability. The tests procedure described in details in the European Norm (EN 1097-1:2011). The current research intends to evaluate the long term durability of andesite aggregate by using extended micro-Deval tests. Andesite aggregate from Recsk (Hungary) was used for the tests. The tested andesite is a massive porphyritic biotite amphibol andesite that was formed during Eocene volcanism and forms a part of Mátra Mountains volcanic complex in NE Hungary. The aggregates were crushed and screened. Size fractions of 10.0/14.0 mm representing minimum and maximum grain sizes were used in the tests. 500 g of aggregate specimens were loaded in the steel drum and 2500 ml of water was added besides the 5000 g of steel balls into the device. The steel balls have a diameter of 10 mm according to EN. The test material - in the first stage - was subjected to 12,000 revolutions in the drum. This number is suggested by the EN. The micro-Deval coefficient was calculated after this first stage. Further wear of the andesitic material was tested by using additional revolutions. The increase in revolutions of the drum was in 12,000 rotation steps, reached 48,000 revolutions as a maximum. The tests were aimed to model the wear of aggregate on a longer term. It was also used to assess the durability of the aggregate when it is applied in engineering structures. The micro-Deval test results suggest that additional revolutions caused additional loss in material, i.e. increase in micro-Deval coefficient. A correlation is suggested between the revolution and andesite wear.