



Problems in Assessment of a Fine Aggregate Quality for the Subbase Layers Related to the Changes of Standard

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The General Technical Specifications for the road construction in Serbia (2009), allow the use of natural crushed aggregates 0/32 mm and 0/63 mm for subbase layers, whose technical characteristics are determined according to the national standards. When assessing the overall quality of the material they do not take into account sand equivalent testing, as criteria for assessment of the quality of fine particles ($\leq 0,063$ mm). The first requirements for the sand equivalent testing appear in projects after 2010, with $SE \geq 60$ criterion. The National guidelines for design and construction supervision (2012) based on European standards also define the sand equivalent criterion: $SE_4 \geq 60$ for high traffic loads, and $SE_4 \geq 50$ for medium or low loads. During the construction of the subbase layers of Corridors 10 and 11, a problem was detected regarding the evaluation of the quality of available materials, according to this criterion. The European Standard for Sand Equivalent (EN 933-8) from 1999 to 2015 has undergone a number of changes, related to the test procedure (reference fraction 0/2 mm, optionally 0/4 mm, corrected fraction 0/2 mm, uncorrected 0/4 mm; both corrected). Corrections consist of replacing the part of the fines with a large, rinsed material (0,063/2 mm or 0,063/4 mm). Thus the formed test sample usually yields high values of the sand equivalent, which often exceeds the limit of 50 and 60, and from the standpoint of the Technical Specifications, aggregates are considered clean. The problem is that on the same samples, using other methods (methylene blue, plasticity index), a presence of clay particles above the allowed values is confirmed. For example, in one limestone aggregate the following values were obtained: SE (10) 54, SE_4 23 (uncorrected fraction) and MB 10.4; $MB_{0/32}$ 3.12. Additionally, comparative studies of the sand equivalent test (on corrected and uncorrected fractions) from four limestone quarries, showing the differences that range from 8% to 49%. The larger differences in the results were obtained in material with the increasing percentage of corrected material, respectively in aggregates with a higher content of clay or plastic fine particles. Changes in the test procedure led to problems in the overall quality assessment of the material. Considering that engineers in Serbia have a lot of experience with American standard (ASTM D2419) in some corridor sections the relaxed limits of sand equivalent criteria were found $SE_4 \geq 45$ (without correction of fraction). An initiative has been launched for parallel sand equivalence testing on all the above fractions, as well as chemical clay testing (methylene blue test) in order to evaluate aggregates according to European regulations. This will led to better experience with domestic materials, and existing boundary values will be confirmed or corrected.