

SUMMARY

Because of a very variable geological composition of the Czech Republic, there is a various scale of all genetic types of rocks that are used for the production of crushed stone. The most often used group of rocks are effusive magmatic rocks, which represent about 34 % of crushed stone marketed (Starý et al. 2010). These rocks are used for all kinds of construction purposes including roads.

The experimental material of crushed stone used in this thesis was sampled from 40 active quarries in the Czech Republic. The studied volcanic rocks originated from Neoproterozoic and Paleozoic complexes of Barrandien, Carboniferous and Permian of Krkonose Piedmont Basin, Carboniferous and Permian of Intrasudetic basin, area of ordovician Železné Hory, from the main volcanic center of Bohemian Massif in the north-west Bohemia (České středohoří Mts. and Doupov Mts.), Neovolcanic area of Czech Cretaceous basin and area of Neovolcanic East and West Sudeten.

Petrographic study was carried out in a form of standard petrographic analysis of thin sections and chemical analysis, which helped inclusion of rocks to a classified systems. The whole suite of volcanic rocks was separated to five petrographic-technologic subgroups defined as: (1) rhyolites / porphyres, (2) phonolites, (3) basalts *s.l.*, (4) spilites and (5) melaphyres / diabases.

Every single rock has been studied in detail for its physical and technological properties. Concerning the physical properties basic index parameters were tested (apparent density, open porosity and water absorption). The most extensive was a group of technological tests, during which mechanical resistance was determined (Los Angeles attrition test, Impact Test value, Polished Stone Value PSV and Nordic abrasion test by Studded tyres). Geometric properties with a shape index of aggregates in according to a standard and modified procedure and with use of image analysis shape parameters were evaluated too. Experimental study have been also aimed to investigate a reduction ratio as indicator of rocks crushability in combination with dependence correlation to the prediction of production cubic grains of aggregates.

Average values of apparent density of aggregates are from 2,406 g/cm³ in phonolite to 3,216 g/cm³ in sodalitic nephelinite. Average values of rocks water absorption are in the range of 1,9 - 0,2 % of Mass. Average values of open porosity are in the range of 4,70 - 0,52 % of Volume. Values of Los Angeles attrition test are from minimal value in spilite (LA = 8,4) to a maximum value in basaltic andesite (LA = 29,2). Average value of the Impact Test are from a minimum value (SZ = 8,9) in basaltic andesite and olivinic analcimite to a maximum value of olivinic nephelinite (SZ = 25,1). Values of the Nordic abrasion test are from the value (A_N = 6,4) in analcimic nephelinite to a maximum value of basaltic andesite (A_N = 43,3). Reduction ratio D_r values from 3,33 in phonolite to 6,16 in basaltic andesite. The studied volcanic rocks exhibit wide range of skid resistance expressed as Polished Stone Value (PSV) in the range from 46 to 60 with normal distribution.

Mechanical resistance (reduction ratio, Impact Test, Los Angeles attrition, Nordic abrasion Test) shows us a different degree of correlations. The best correlation was found between the Impact Test and Los Angeles attrition test and between the Nordic abrasion test and Los Angeles attrition test. A very low degree of correlation was found between the Impact Test and Polished Stone Value, between reduction ratio and the Nordic abrasion test, between Los Angeles attrition test and Polished Stone Value, between the Impact Test and the Impact Test and between Polished Stone Value and reduction ratio. The Impact Test, the Nordic abrasion test and reduction ratio with Los Angeles attrition test show considerable variability too. Complete data set was used for all types of studied volcanic rocks during analysis between every single parameters of correlations, and withal separated for each of petrographic-technologic group. These results indicate, that correlations give us not only a different tightness, but also different trends in some cases.

In the part of study, aimed to an experimental crushing and forthcoming size and shape analysis of grains was confirmed, that crushing of all petrographic-technologic rock types produced grains with a

cubic shape index in a zone of size setting (even with using only one degree of crushing). A direct correlation of grains shape with a reduction ratio of rocks was not identified.