

**P 18. THE EFFECT OF PHYSICAL HETEROGENEITY ON THE USABILITY OF
BASALTS AS RAILWAY BALLAST: A CASE STUDY FROM THE EVCİLER BASALTS,
ANKARA-CENTRAL TURKEY**

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ABSTRACT: The quality of railway ballast has a profound effect on the maintenance of integrity of railway. Therefore, ballast materials are expected to fulfill many specific criteria, such as crack-free, low porosity and clay content, high compressive strength, resistance to abrasion and weathering etc. Basalts are widely used as railway ballast worldwide. Based on field observation, petrographic and physico-mechanical tests, we investigated the usability of the Evciler Basalt (Elmadağ Volcanic Complex-EVC, Ankara) as railway ballast in this study. The EVC is one of the most important Miocene volcanic field, comprising mafic mildly alkaline and intermediate to felsic calc-alkaline lavas. The mafic lavas are called as the Evciler basalts and represented by alkali basalts. They display porphyritic texture with olivine and clinopyroxene phenocrysts in an intergranular groundmass including mainly plagioclase, clinopyroxene, lesser opaque and rare anorthoclase. The field characteristics of the basalts resemble those of “aa lavas”. Based on the field observations, we identified three zones from top to bottom in a few meters cooling unit of the basalts: (A) a vesiculated flow top, (B) a massive interior, and (C) a basal breccia. Following the physico-mechanical tests, we observed that water absorption, Los Angeles abrasion and magnesium sulphate soundness of the zone B are the lowest, but particle density of the zone B ranges between those of the zone A and C. Based on the obtained data, we found that the zone B is appropriate for ballast material in just conventional railway rather than the zone A and C. Accordingly, our findings show that small-scale vertical physical heterogeneity is so high in a basaltic flow, and it is advised to be careful for selection of ballast material from basaltic volcanic rocks.

Keywords: Railway Ballast, Physical Heterogeneity, Basalt, Evciler, Ankara