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Chemical, Physical and Geotechnical Properties Comparison between Scoria and Pumice Deposits in Dhamar – Rada Volcanic Field -SW Yemen

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ABSTRACT

This paper presents a study for the chemical and physical properties of Scoria and

Pumice deposits in Dhamar – Rada volcanic field, and assess these deposits in

manufacturing lightweight concert. The study area is located 95 Km SE Sana'a city

(the capital of Yemen), extends to southeast of Dhamar city and spread to Rada`

district. It is covering an area of approximately 2500km2. Thirty representative

samples were collected from different areas of Dhamar – Rada volcanic field, as 15

samples for Scoria and 15samples for Pumice deposits . The chemical analysis

results revealed that Scoria deposits have Basaltic composition with an average of

47.54% Sio2, and Pumice deposits have Rayolitic composition with an average of

71.67% Sio2. The chemical analyses of the Scoria and Pumice deposits of Dhamar –

Rada volcanic field are within the standard range of the chemical analyses of the

worlds similar deposits. The physical properties showed that the average of porosity

, water absorption and bulk density of the Scoria deposits are 51.66% , 30.17 % and

907 Kg/cm3 and for the Pumice deposits are 60.56% ,31.6% and 743.8 Kg/cm3

respectively. The compressive strength of lightweight concrete cubes after 28 days

varies between 27 and 31.5 Mpa, with density between 1601 and 1750 Kg/m3 of the

Scoria lightweight concrete (SLWC). However the Pumice lightweight concrete

(PLWC) cubes compressive strength after 28 days varies between 15.6 and 17.4

Mpa with density between 1222 and 1312 Kg/m3. The chemical and physical

properties of the Scoria and Pumice deposits in the Dhamar – Rada volcanic field

indicated they are generally suitable as a light weight aggregate , and satisfying the

ASTM requirements for producing lightweight concrete..

Key words: Physical Properties, Scoria, Pumice, Lightweight Concert, Average of Porosity, Water Absorption and Compressive Strengt