IJG> Vol.3 No.1, February 2012

OPEN ACCESS

Geomechanical Characterization of Sandstones Cliffs of Segou (Senegal, West Africa) in the Madina Kouta Basin

PDF (Size:1802KB) PP. 166-174 DOI: 10.4236/ijg.2012.31018

Author(s)

Déthié Sarr, Meissa Fall, Papa Malick Ngom, Mapathé Ndiaye, Cheikh H. Kane, Makhaly Ba

ABSTRACT

This work presents the behavior of Segou sandstones in the laboratory and in the field conditions. Four types of sandstone are collected in the northern part of the Madina Kouta basin (*eastern Senegal*). These types of specimens are the white sandstones, the red sandstones, the purple sandstones and the sandstones with intercalation of pelites. Uniaxial tests are carried out on these specimens of sandstones. The Young Moduli (E) and the Uniaxial Compression Strengths (Rc) are higher for the white sandstone. Values of the mechanical parameters decrease slightly for red sandstones due to an increase of the amount of pelites in the composition of the rock. Decrease of mechanical parameters is more important for the purple facies due to an important network of fractures. The facies with weaker characteristics corresponds to the sandstones with intercalation of pelites. This is due to the soft nature of the pelites. The slope stability of the Cliff sides depends also on to these characteristics.

KEYWORDS

Unconfined Compression Test-Uniaxial Compression Strength (UCT, Rc); JRC (*Joint Roughness Coefficient*), Young Modulus (E); Roughness; Segou-Madina Kouta Basin; Discontinuities; Dihedral; Slope; Cliff

Cite this paper

D. Sarr, M. Fall, P. Ngom, M. Ndiaye, C. Kane and M. Ba, "Geomechanical Characterization of Sandstones Cliffs of Segou (Senegal, West Africa) in the Madina Kouta Basin," *International Journal of Geosciences*, Vol. 3 No. 1, 2012, pp. 166-174. doi: 10.4236/ijg.2012.31018.

References

[1] M. Villeneuve, "Etude Géologique de la Bordure SW du Craton Ouest-Africain—La Suture Panafricaine et l'Evo- lution des Bassins Sédimentaires Protérozo?ques et Paléo- zo?ques de la Marge NW du Continent de Gondwana," Thèse de Doctorat, Université d'Aix-Marseille III, 1984.

[2] C. Bense, "Les Formations Sédimentaires de la Mau- ritanie Méridionale et du Mali Nord Occidental (Afrique de l'Ouest)," Thèse d'Ingénieur Doctorat, de l'Université de Nancy et Mémoire, 1964.

[3] J. P. Bassot, "òEtude Géologique du Sénégal Oriental et ses et ses Confins Guinée-Maliens," Mémoire BRGM, 1966, N?40, p. 332.

[4] R. Trompette, "Le Précambrien Supérieur et Paléozo?que Inférieur de l'Adrar de Mauritanie (Bordure Occidentale du Bassin de Taoudéni, Afrique de l'Ouest): Un Exemple de Sédimentation du Craton," Thèse de Doctorat d'Etat, Université Aix Marseille, Marseille, 1973.

[5] COGEMA, "Plan Minéral de la République du Sénégal," Vol. 2, 1982, pp. 566-572.

[6] PASMI, "Cartographie Géologique du Sénégal Oriental. Carte Géologique au 1/200000, Feuille Saraya-Kédougou Est," Notice Explicative, 2010.

[7] N. Barton and N. Choubey, "The Shear Strength of Rock in Theory and Practice," Rock Mechanics, Vol. 10, 1977, pp. 1-54.

[8] M. J. A. Leal-Gomes, "Some New Essential Questions about Scale Effects on the Mechanics of Rock

Mass Joints," University of Trás-os-Montes e Alto Douro, Vila Real, 2003.

[9] M. Jaboyedoff, "Caractérisations Géométriques Simples des Discontinuités dans un Massif Rocheux. Quanterra," International Independent Center of Climate Change Impact on Natural Risk Analysis in Mountains Area, 2003.

[10] J. Zhao, "Propriétés des Discontinuités," EPFL-ENAC- LMR, 2008.

[11] ISRM, "Technology Roadmap for Rock Mechanics," South African Institute of Mining and Metallurgy, 2003.