

COLLAPSIBILITY OF GYPSEOUS SOIL IN TIKRIT/SALAHADDIN/IRAQ

Khaled Ahmed Abdullah Alhadad

Applied Geology Department /College Of Sciences/ Tikrit University/ Iraq

(khaledalhadad@yahoo.com)

ABSTRACT

This research aim is to study, Collapsibility phenomena in Tikrit city, Salahaddin government, north Iraq, which suffered many troubles in building, as well as, cracks, foundations settlement, also troubles happens, in roads & streets, as cracks, subsidence. Three subsurface undisturbed Samples, selected from three sites, every sample, kept in closed nylon envelopes, to stay moist as in field, gave sample serial numbers; many photos took, for damages & treatments sites, in Tikrit city Laboratory stage included, (45)Tests & Analysis are done, according to , American standards for test & materials (A.S.T.M) & British Standard (B.S.), Some physical properties results , as Grain size distribution. Samples consist of Clay (34% - 45%), Silt (52% - 60%), Sand(3% - 6%) in addition to Gypsum content (22.35 % – 53.15%) ,which played important role , in changed Soil properties , Plasticity Limits , Liquid limit (23% - 37%) , Plastic Limit (21% - 31%) and Plasticity Index (6% - 7%) , inorganic soil low plasticity Silt (ML) , Clayey Silt (CL – ML), moisture content (1.9% - 2.2%) in fact it be low value, due to high Gypsum content, which took water amount, to kept it in molecule structure . Specific gravity values (Gs) (2.31 – 2.47). Some Soil Mechanic properties pointed to Direct shear elements, as Cohesion & Internal friction angle (C , Ø)(40 – 51) kN/m², (25° - 33°) respectively, Pre- consolidation Pressure(Pc)(125 -275) kN/m², Collapsibility potential(Cp* 100) (1.41 – 1.85) kN/m², Collapsibility sever problems of research area ,classified as (Moderate trouble) due to standard classification. Some chemical properties, as Total dissolved salts (T.D.S.) (24.24 % - 56.63 %), Gypsum content (22.3 % - 55.1 %) and pH values (6.55 – 6.67). Office stage, drawing located map, arranged results values in three tablets, represented result values on sventeen figures represented (grain size distribution curves, plasticity chart, direct shear figures, consolidation curves pressure vice versa void ratios, collapsibility curves and Correlations Coefficient (r) for Collapsibility Potential vice versa Gypsum content ,T.D.S. ,L.L. ,P.L. ,Clay% ,Silt%) gives interpretations, Conclusions Gypseouse soils become soft soils when it be wet, stiff & consolidated soil when it be drying. When gypsum & salts dissolved in water, happened leaching for soils, so grains disaggregation, soil structure destroyed, soils collapsed, so foundations subsidence, walls buildings cracks. Roads cracks & sink halls, etc. Many conclusions are pointed , pH values less than (7.0), that it mean acidic , as result of, acidic root, Sulphate ion. Collapsibility Properties. Shows (1-5) kN/m² as (Moderate Trouble), accesses with (Gypsum & Salts dissolved).

Keywords: Collapsibility Potential, pre – consolidation pressure, Plasticity Limits, Cohesion.