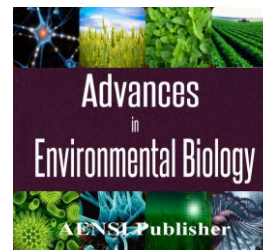




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Assessment of Geotechnical Properties soil of Jam-e-jam Residential Complex, Zahedan (East Iran).

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ABSTRACT

Jam-e-Jam Residential complex, located eastern of Zahedan city (East Iran) at the jam-e-jam Blvd. The aim of this study was to evaluate geotechnical engineering and geological characteristics of the soil. To achieve these goals, two machine-drilled boreholes and test parameters required to perform the extraction. The results show that Most of studied soils of type SM, SC-SM, SP-SM and in 8 m depths are CL-ML. In The SPT tests, classified as hard and dense soils. In chemical experiments, PH value of borehole samples BJ-1, between 7.95 to 8.52 and the borehole BJ-2, 8.15 to 8.5. The amount of sulfate in acid, variable between 1481 to 2808 in BJ-1 borehole and borehole BJ-2, between 2233 and 6624. Chlorine content of the soil in the hole BJ-1, between 886.3 to 1506 and the borehole BJ-2, is 1275 to 4697.2. The borehole BJ-1, from surface to depth, soil PH value, and CL increases. But speculation BJ-2 is not such a relationship.

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INTRODUCTION

Zahedan located south-eastern Iran between is the length N29° 26' to N29° 36' and E60 54 to E60 48 latitude. N29 36. Zahedan north and west to south and east to the granitoid body and narrow alluvial deposits ends. Residential Jam-e-Jam Boulevard East is located at the beginning of Zahedan (Figure 1). The aim of this study was to investigate the properties of geotechnical engineering soil is scope to achieve these goals, two mechanized boreholes drilled and the required parameters were derived from experiments performed.

Zahedan, in terms of geology, the flysch zone, East of Iran with the general trend of North - South is located [1].



Fig. 1: Geographical Zahedan and Jam-e-Jam residential complex locations.

2 - Physical, chemical and mechanical soil:

2-1 - Soil Classification:

In order to determine the type of soil used the United States classification at various depths and the results of the classification of samples from boreholes in Table 1.

Table 1: Soil Classification

Boreholes	Depth (m)	Soil Classification	Boreholes	Depth (m)	Soil Classification
JB-1	0-0.2	Fill Material	JB-2	0-0.2	Fill Material
	0.2-2.6	SM		0.2-2.6	SM
	2.6-3.6	SP-SM		2.6-3.6	SP-SM
	3.6-4.6	SM		3.6-4.6	SC-SM
	4.6-6.6	SC-SM		4.6-7.6	SM
	6.6-7.6	SM		7.6-8.6	CL-ML
	7.6-8.6	CL-ML		8.6-10	SM
	8.6-10	SM		-	-

2-2 - Natural density:

The dry density and moisture present in situ tests do by cone of sand way according to ASTM-D-1556 in the this depths that its result in Table 2.

Table 2: Results of dry density and moisture present.

Boreholes	Depth (m)	dry density (g/cm ³)	moisture present	Boreholes	Depth (m)	dry density (g/cm ³)	moisture present
JB-1	1	1.82	1.8	BJ-2	1	1.79	1.6
	2	1.82	2		2	1.8	1.7
	3	1.81	2.1		3	1.79	1.9
	4	1.89	2		4	1.82	2.3
	5	1.89	2.2		5	1.84	2.2
	6	1.93	2.3		6	1.85	2.5
	7	1.93	2.3		7	1.89	2.7
	8	1.84	2.3		8	1.82	2.8
	9	1.92	2.5		9	1.9	3.2
	10	1.93	3		10	1.95	3.3

2-3 - Atterberg limits:

Atterberg method for describing the sensitivity of fine-grained soils in relation to changes in their moisture content was coined. Based on an original contract, depending on the moisture content, the nature and behavior of the soil can be divided into four major categories that include solid, semi-solid, plastic and liquid.

2-3-1- Liquid Limit:

Border the pulp and liquid. The moisture content of the soil shear strength is low, this parameter using Kasagranderh, measured according to ASTM-D 4318 standard [7].

2-3-2- Plastic Index:

Moisture content at which a sample is on the verge of dough or shaping, this test method is standardized according to ASTM-D 4318. These tests were conducted on samples of soil disturbed soil.

Table 3: Results of Atterberg limits tests.

Depth (m)	Boreholes	Liquid Limit	Plastic Index	Boreholes	Liquid Limit	Plastic Index
1	JB-1	20	2	BJ-2	20	20
2		20	2		23	3
3		16	16		21	3
4		18	18		23	4
5		24	4		21	2
6		23	4		23	3
7		19	19		20	2
8		22	5		22	5
9		22	3		18	18
10		20	2		17	17

2-4 - Relative Density:

Standard penetration test (SPT) do in different depths for relative density. In this test record hacks which it fall with 63.4 kg. sinkers of 76 cm. high cause that infiltrated 30 cm. with 45 cm. length and 3.6 cm. diagonal that its results show that coarse grain zone relative density and fine grain zone solidity [2-4,8-10].

Change of SPT strike show that according depth in different bore. It according to ASTM-D-1516.

Table 4: Results of SPT tests.

Boreholes	Depth (m)	SPT	Description	Boreholes	Depth (m)	SPT	Description
JB-1	3	40	Dense	BJ-2	3	41	Dense
	6	40	Dense		5	42	Dense
	9	41	Dense		8	38	Hard

2-5 - Chemical Tests:

PH, Acid sulfate and soil CL matured in chemical tests. Result in table 5.

Table 5: Results of Chemical tests.

Boreholes	Depth (m)	PH	Acid in sulfate	CL	Boreholes	Depth (m)	PH	Acid in sulfate	CL
JB-1	2	7.95	2808	886.3	BJ-2	2	8.4	6624	4697.2
	3	8.05	1481	976.4		3	8.25	3124	1275.3
	4	8.14	1560	1019.2		4	8.36	2233	1280.9
	5	8.22	1735	1158.5		5	8.16	2364	1285.1
	6	8.45	2074	1233.2		7	8.5	2360	1285.1
	8	8.52	2203	1506.7		9	8.14	4392	1418

Conclusion:

According to the soil classification, soil type studied further with sand and silt with low plasticity property (SM) has a low plasticity clayey sand (SC-SM) and silty sand sample size was bad (SP -SM) and at a depth of 8 meters, sandy clay (CL-ML) of pulp vitality is low.

The Standard Penetration Test (SPT) in exploratory boreholes indicate that fine-grained and coarse-grained soils segments identified in the scope of the project (after the soil crust by hand) from stiffness and density, respectively, in the category classified are "hard" and "dense".

Moisture percent of the samples, BJ-1, between 1.8 to 3 and BJ-2 between 1.6 to 3.3. The results of Atterberg limits, physical limits on speculation by BJ-1 and BJ-2 between 16 to 24 and 17-23 percent of the dough between 2 to 19 and 3-20 percent.

Dry density between 1.81 to 1.93 in BJ-1, between 1.79 to 1.95 in BJ-2.

Based on the results of chemical tests, PH value in samples in borehole BJ-1 is between 7.95 to 8.52 and BJ-2 borehole is between 8.15 to 8.5. Acid in sulfate is Variable in BJ-1 borehole between 1481 and 2808 and between 2233 and 6624 BJ-2 borehole. Chlorine content of the soil in the hole between 886.3-1506 BJ-1 and BJ-2 borehole is between 1275 and 4697.2.

The BJ-1 borehole from the surface to depth, soil PH value, and increases CL in BJ-2 borehole, but this relationship does not exist.

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