



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**

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**ENGINEERING GEOLOGY CHARACTERISTICS OF MIYANROOD DAM SITE  
(SOUTH EAST OF IRAN)**

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**ABSTRACT**

Nutritional Miyanrood earth dam with a concrete spillway span length of 80 meters, along the crest of the dam, 413 meters, the height of the basement, 14 m and height of the river, 10 meters, in the southeast Mirjaveh, Sistan and Baluchestan is located. The dam, with the objectives, control, storage and flood guidance for artificial recharge of aquifers is built. In this research, library research, including gathering information from books, these and similar letters, aerial photographs and satellite images and reports from the District of Sistan and Baluchestan, then, field visits, Geology and engineering geology survey of the reservoir and dam axis. Dam site, on the set of the Cretaceous-Eocene flysch, a part of the Neogene clastic rocks are volcanic and ultrabasic and products. 233 joints of the abutments were harvested. The bedding, the right abutment and varied between 60 and 85 degrees slope, between 145 to 335 degrees. the joint sets available, perpendicular to the layering process, which will certainly cause the water to escape. Anchor the barrier layer Miyanrood, as close to vertical as well as in the direction of the water flow, which is also accelerating the water to escape. The results show, that the poor quality of the rock mass can be caused by numerous faults, is at the site.

**Keywords: Miyanrood earth dam, Ladiz, Engineering geology, flysch.**

**INTRODUCTION**

Dams of hydraulic structures which are constructed with the aim of collecting surface water. May for purposes such as storing water for various uses, power generation, flood control are used, (Rahnamead et al., 1392). To run any dam project, check

subsurface geological and hydro-geological and geomechanical parameter estimation foundation and anchor the dam. So that we can properly evaluate the geotechnical characteristics of the bedrock in the area was the site (Rahnamarad et al., 1392; Farhoudi et al., 1386; Kockbay and Kilic, 2006; Dadkhah, 2010; Ajalloeian and Moein, 2009; Lashkaripour and Ghafoori, 2002; Ghafoori et al., 2011).

Careful study of the phase detection can prevent problems in the implementation and operation of dams (Haftani et al., 2014). The question of dams to harness water and surface water storage and flood season precipitation and its use in the dry season is vital and inevitable (Mahtabi et al., 1392).

Miyanrood Nutritional Dam, located in the Sistan and Baluchestan. The earthen dam and to control the storage and floods led to the

desired location for artificial recharge of aquifers (built Sistan and Baluchestan Regional Water Company). The purpose of the the dam downstream of that table will be more and more rich and full of water. miyanrood Nutritional dam of Zahedan city in Sistan and Baluchestan, 85 kilometers East a distance of 5 km of the Ladiz Rural District, a position "33 52° 28 northern and eastern plains "9 14° 61 Ladiz located. dam site of the Zahedan road access to the village compote Ladiz Mirjaveh then possible (Figure 1). To achieve the research objectives, the baseline data collected in the field and then visited of the study area was conducted for testing soil and rock samples were transferred to the laboratory using the reports of taking place at the drilling Sistan and Baluchestan regional Water Authority was analyzed.

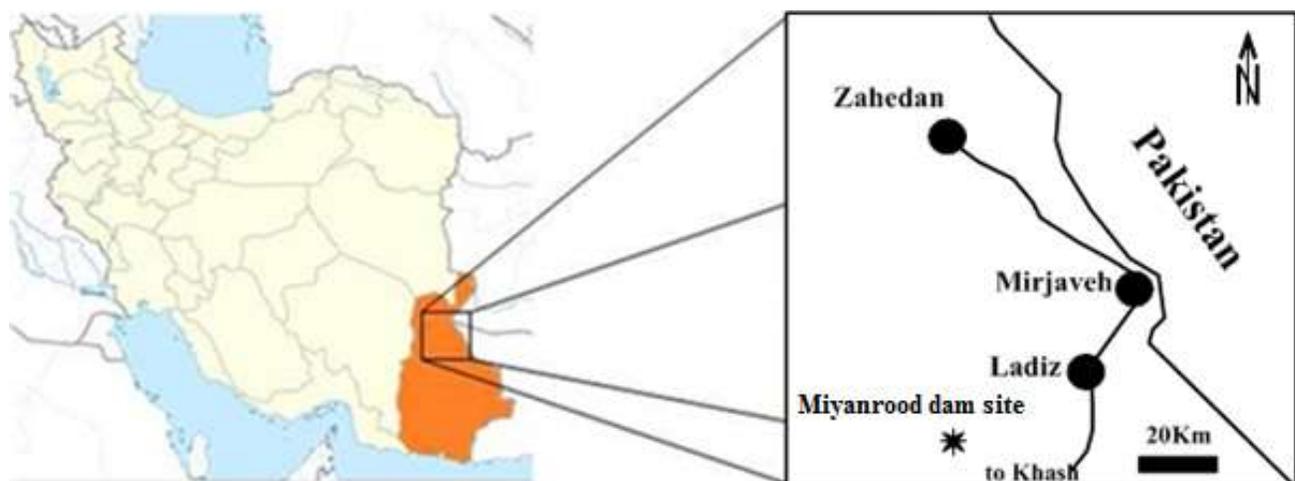


Figure 1. Geographical location and the access to the Miyanrood dam site

## 2. Geology

Study area, the structural division of the zone Nhbndan- Khash (Aghanabati, 2004), the fault Hryrvd the East and the West is Nehbandan fault. According Map 1: 100,000 Geological and Mining Exploration Taftan the country produced more rock units in the study area contains a mixture of colored flysch Cretaceous, Paleocene, Eocene flysch with the ultrabasic products Neogene volcanic and clastic rocks is (Stoklin, 1968).

Taftan peak height of 4000 meters, in the southern plains Ladiz, the highest point of elevation in the output is plain. 960 m above sea level, height, average height of 1770 meters and an average altitude desert basin is 1070 meters.

The tectonically, the zone Ladyz Nehbandan - Khash is the most important geological features colorful mixture of oceanic basement and flysch Cretaceous and Eocene. Faults in the study area consists of a single stone with their movements are sometimes a source or by movements in the Quaternary resulted are the formation of various alluvial deposits (Figures 2, 3).

In the study area, the boundary between the Cretaceous-Paleocene and Eocene flysch, but

not seen in the area marked off the Eocene flysch gradually and with local antagonistic flysch is older. The main difference flysch Cretaceous - Paleocene and Eocene flysch include Eocene flysch, are sand, volcanic dust in the Eocene flysch much more. Further expansion of the Eocene flysch sedimentation caused by relaxation area in general is related to the unit.

## 3. The system discontinuities

A total of 64 discontinuities in the right Tkyh-Gah harvest. Surface discontinuities harvested, rough, without filling, an average of 1 to 2 mm distance between the joints and in some cases, such as the location of folds and faults more than 2 centimeters. The backrest joint sets that include a total of 2 layers and lots of tangled fractures have been identified. Charts and graphs of polar curve equivalence rose joints 3 and 4 are shown in the Figure 3.

The left abutment, a total of 64 surface discontinuities are harvested. A total of 3 sets of joint specified. Equivalence polar curve charts and graphs rose joints are shown in Figures 5 and 6.

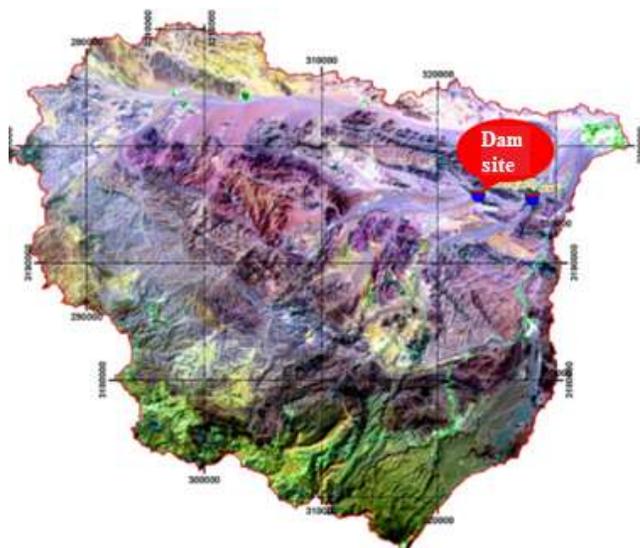


Figure 2. Satellite image of the catchment Ladiz, and at the site

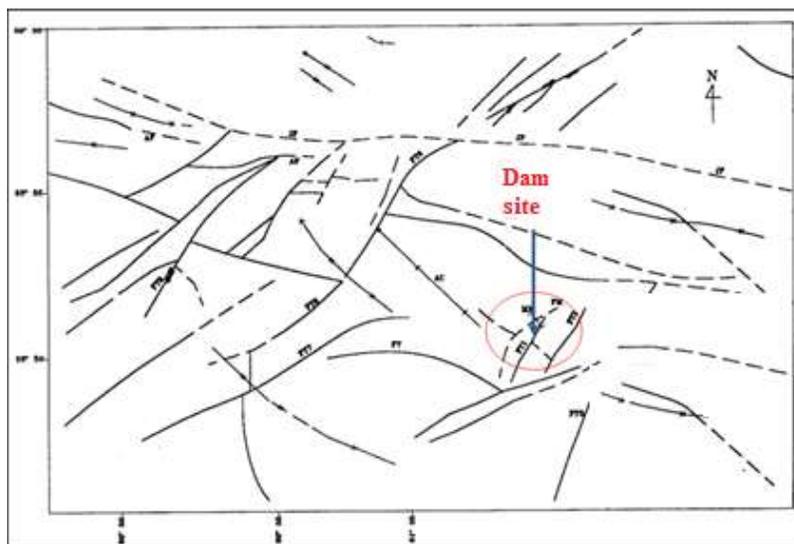


Figure 2. Faults closely the Miyanrood dam site

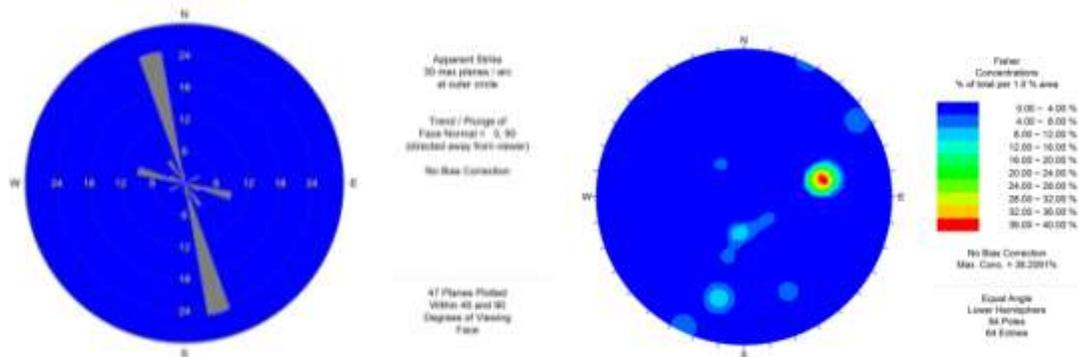


Figure 3: The figure rose diagram and joint pole curve equivalence on the right abutment

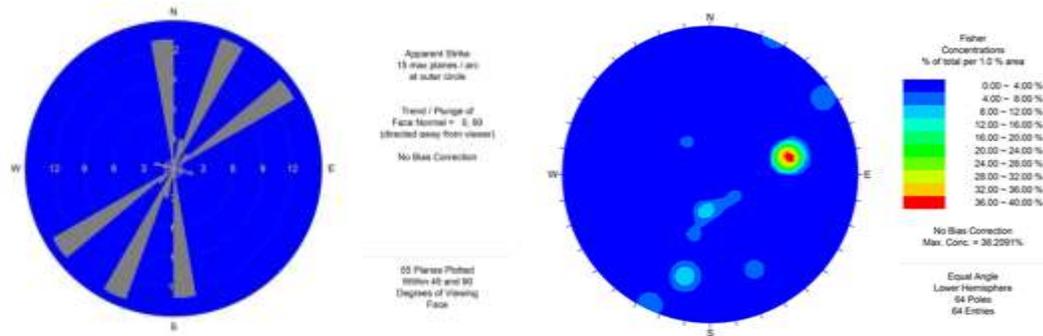


Figure 4. The figure rose diagram and joint pole curve equivalence on the left abutment

#### 4. The study of regional groundwater

The ground water exploration drilling and geophysical methods have been studied. In the study area geophysical surveys have been conducted in the two periods. Beginning in year 52 and 53 137 electrical sounding, with  $m_{AB} = 1000$  m by Pars Consulting Engineers console and further studies by consultants Shrakav in 1372, to investigate the possibility of artificial recharge Ladiz Plain, in the valley of Mesopotamia was, in in this study, 175 electrical sounding  $AB = 400$  m, 35 was studied by probing with  $AB = 800$  m, which is to say, the thickness of alluvium, which varies between zero to one hundred meters, and the bedrock, in the north, in the east - Western indented, and the specific resistance of the alluvium, of the upstream to downstream side is low, indicating that the fine-grained sediments, which leads to high water levels (5 to 15 cm) is.

As well as to evaluate and determine the groundwater aquifer hydraulic parameters at 55 and 56 years, three exploratory wells were drilled four wells and piezometers. With regard to the scope of the study only 13 exploratory wells and piezometers ring was drilled by Squad of Zahedan.

##### 4.1. Evaluation of aquifer thickness

Based on an exploratory study conducted in the region can be said Ladiz aquifer thickness is variable. Based on the results of exploratory excavations, Ladiz aquifer thickness varies of the 7/37 to 60 meters. Which has an average thickness of about 12/47 meters.

#### 5. Geological and geotechnical characterization of dam site

To achieve this goal, a number of boreholes drilled. Based on the results of borehole and surface impressions, less than a meter thick alluvium of the river and its materials, mainly sand with pebbles and boulders are.

## 6. Engineering Classification of site rock masses

### 6.1. Rock masses quality

In order to evaluate the parameters of rock masses dam site, exploratory boreholes were analyzed, and the results of the rock quality (RQD), respectively. The quality of the rock mass by layers of rock lithology and system density and fractures in the rock joints and angles and is a kind of layering. Rocks anchor the site is in the category of poor quality.

### 6.2. Geomechanical classification (RMR) rocks site

To evaluate the classification and anchorages have been evaluated following the borehole. In this context, the structural properties rock masses containing discontinuities, faults and joints were examined. Based on the results of the laboratory and field tests such as uniaxial compressive strength, RQD, permeability and discontinuity systems and their status, RMR for rock masses classification was done. The results are shown in Table 1.

Table 1: The system of rock mass rating (Bieniowski, 1989)

Rock type Parameters	Right Abutment	Left Abutment
Uniaxial compressive strength (Mpa)	90	90
Score	7	7
RQD %	20	20
Score	3	3
Speacing	0.1	0.1
Score	8	8
Discontinuities surface	Rough and uneven	Rough and uneven
Score	10	25
Ground water	Dry	Dry
Score	15	15
Total Score	42	58
Discription	relatively good	relatively good

## CONCLUSIONS

Poor quality rock mass can be caused by multiple faults within the site. A total of 233 joints, were harvested from the fulcrum. The bedding, the right abutment, varying between 60 and 85 and between 145 to 335 degrees layered slope, the existing joint sets, perpendicular to the layers, which will definitely cause the water to escape . Anchor the barrier layer Miyanrood, as

closely to vertical as well as in the water flow, which act to accelerate the water to escape.

Rock mass site, the geomechanical classification (RMR), in the category of stones are relatively good.

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