

Geological Assessment of the alignment corridor proposed for
the Construction of 9 Km Gogata-Affo Kedar motor road
District- Almora.

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1- Introduction:- The Construction Division, Public Works Department, Rankhet has proposed the construction of 9 Km Gogata - Affo Kedar motor road, District Almora. On the request made by Mr. M. C. Joshi, Executive Engineer Construction Division Rankhet, I carried out the geological assessment of the proposed site of the above said motor road on 19/07/2016. Junior Engineer Mr. Pradeep Joshi and Mr. Vijay Barnola also accompanied during the site visit.

2- Location- The site in question starts Km 2 of Masi-Gerkhet motor road. Total length of the motor road is 9 Km which consists of 6 HP Bend at 5/0, 5/6, 5/12, 5/9, 6/12 and 6/20 chainage respectively. The proposed motor road passes from Bhatoli, Kanhonhi, Gogta, Jayal bakhali, Perthola and Affo Kedar villages.

The co-ordinates of starting and end point taken from hand held GPS are as follows-

Starting Point	End Point
Latitude- 29°49'13.97"N	Latitude- 29°47'19.91"N
Longitude- 79°16'47.15"E	Longitude- 79°15'4.75"E

3- Geological Assessment:- The alignment corridor proposed for the above said motor road lies in part of Kumaun Himalayas. Geologically the site in question lies in Almora Nappe of Kumaun Lesser Himalaya. Almora Nappe is bounded by South Almora Thrust (SAT) in South and by North Almora Thrust (NAT) in the North. It comprises rocks of Almora Group. Almora Group comprises of two different lithological units which are Biotite Mica Schist, and Micaceous Quartzite of Saryu Formation and Granite-Granitic Gneiss-Granodiorite plutonic bodies. The end portion of the proposed road falls near to a NNW-SSE trending tear fault.

The site in question comprises of both Garnet mica schist and Micaceous Quartzite (Fig 2 & 3). In between Schist thin bands of Quartzite are observed. Schist is weak in strength and deformed. Comparatively Micaceous Quartzite is compact and hard. The strength of the rock is estimated by manual test. High grade of deformation and weathering is observed on schist. Largely the rocky strata along this alignment are capped by thin overburden material which varies in thickness from place to place and overall less than 1m. The soil material has micaceous content and the matrix is fine to very fine. The soils are good cohesive, dense and hard in dry conditions but these converts into soft clays under the wet/saturated conditions.

The topography of the area is gentle to moderately steep. Majority of the proposed road passes through cultivated terraces. The rocks are slightly to moderately weathered and oxidized up to W_1 - W_2 grade. Hydrological conditions in this area are mainly dry in the fair weather.

Two prominent joint sets which were recorded from the schist outcrops exposed at the site are as follows:-

Table-1

S.No.	Feature	Dip angle	Azimuth
1	Foliation/Joint J1	15°	N 260°
2	Joint J2	5°	N 100°
3	Slope	25°	N 90°

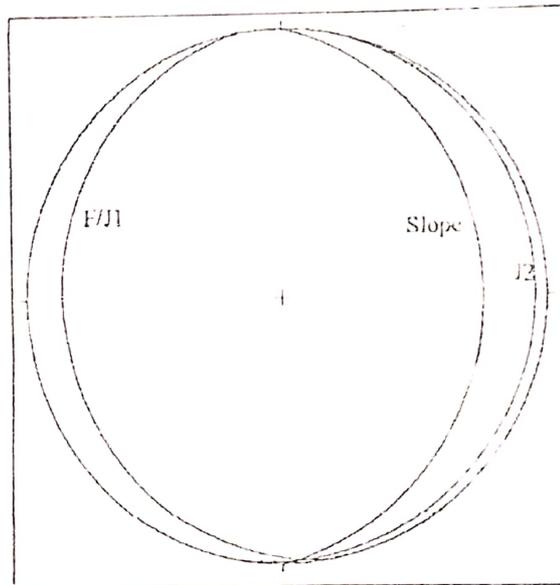


Figure 1 Stereographic projection of Joints and Slope data observed in Schist outcrop

Two prominent joint sets which were recorded from the Quartzite outcrops exposed at the site are as follows:-

Table-2

S.No.	Feature	Dip angle	Azimuth
1	Joint J1	10°	N, 60°
2	Joint J2	60°	N 100°

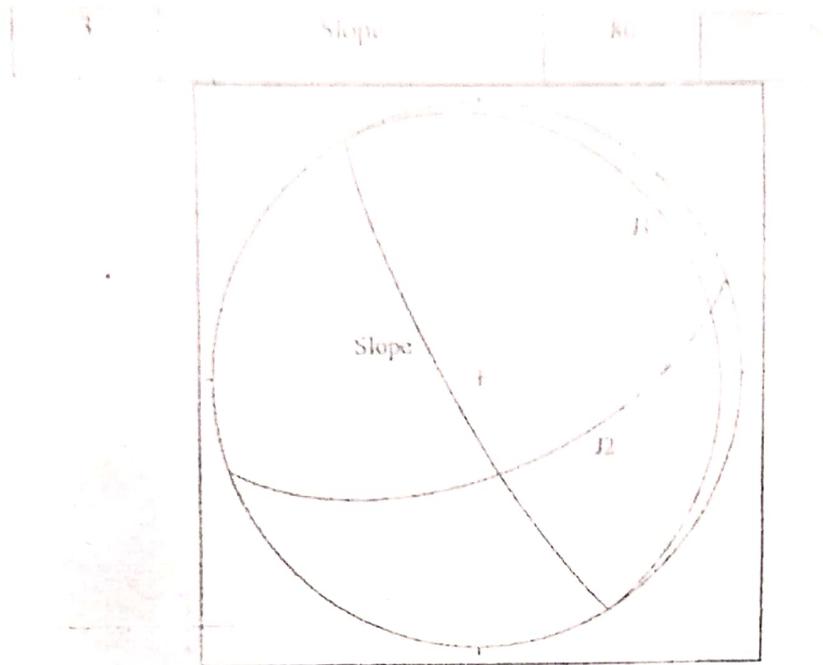


Figure 2 Stereographic projection of Joints and Slope data observed in Quartzite outcrop

From the above stereographic projection Fig 1 it is clear that joint J2 is parallel to slope direction thus it impact on the stability of the area. In Fig 2 Joint and Slope direction are different from which it looks stable and quite competent from the stability point of view.

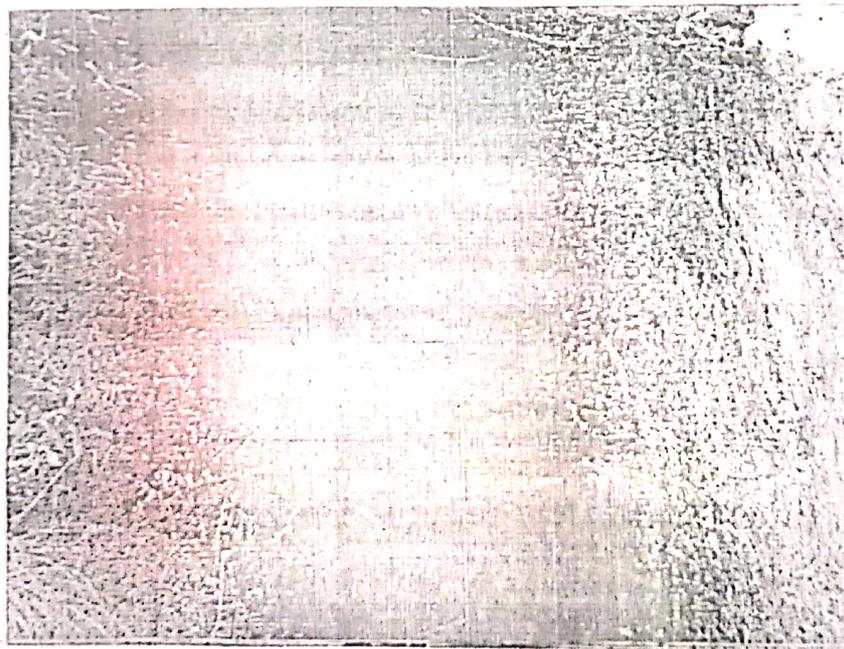


Figure 3 Outcrop of Schist observed near to the starting point



Figure 4 Outcrop of Quartzite exposed at the site

On the basis of the geological/geotechnical studies carried at the site and the fact mentioned above the following recommendations are being made for the construction of the proposed road, failing to these recommendations this report will be treated as cancelled.

4- Recommendations-

- 1- Do not blast heavily by explosives. It is recommended that the blasting shall be carried out by controlled method i.e. by leaving large volume of dummy holes
- 2- The entire hill and valley side slope along the whole length of the road must be protected by suitably designed retaining/ breast walls. This work should be done simultaneously with the advancement of the road cutting. It is advised to leave sufficient weep holes in the walls; this is so as to facilitate the subsurface drainage
- 3- Properly designed culvert/bridges must be constructed over the nala whichever and wherever is suitable.
- 4- Construct U shaped lined drain all along the hill side of the road and made adequate cross drainage arrangements. The accumulated rain water from upper reaches of the hill must not allow to flow freely over the road constructed and its lower hill slopes

- 5- The upslope side of the road must be properly protected wherever necessary as there can be problem of translational failure
- 6- Disposal of muck and excavated waste on the lower slopes of this road is to be strictly avoided. It is advised to dispose the muck on the identified site for muck disposal
- 7- The portion of the road which passes through the cultivated field where water seepage from the ground is high, RCC should be done
- 8- All the construction activities must be carried out as per the prescribed norms and the standard codes of the practice laid by BIS and MORTH

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प्रारूप-34

परियोजना का नाम :- अल्मोड़ा में विकासखण्ड स्याल्दे के अन्तर्गत प्रधानमंत्री ग्राम सड़क योजना में मासी-गैरखेत से परथोला (लिंक रुट) मोटर मार्ग के वन भूमि हस्तान्तरण प्रस्ताव।

भू-वैज्ञानिक की संस्तुतियों/सुझावों का अनुपालन किये जाने का प्रमाण-पत्र

प्रमाणित किया जाता है कि विषयगत परियोजना के निर्माण हेतु भू-वैज्ञानिक द्वारा दिये गये सुझावों/संस्तुतियों का अनुपालन सुनिश्चित किया जायेगा।

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