Engineering Geological Considerations during Construction stage of a Bridge- A case Study of Pannar Bridge, Moghul Road, J & K

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Abstract

Engineering geological considerations play a very important role during planning, construction and design stages of a bridge. Most often bridges fail as engineering geological considerations were not taken into account despite being best civil engineering practices adopted for the same. The paper deals with a problem encountered during the construction stage of a bridge being constructed at Pannar site, Moghul Road, Jammu and Kashmir during the 2012. A perusal of geotechnical investigations revealed fissure / cavities on the inclined base rock over which raft foundation has already been erected on the Srinagar end of the bridge location. It was felt necessary to take into account engineering geological considerations to avoid future failure / problems. A detailed visual reconnaissance survey along with ground truth verification was carried out. This involved geological settings, lithology, geomorphic features and existing information. The base of the abutment is comfortably placed at 9 m above from the river bed. Exposed rocks on the river side were found to be jointed and having weak bedding planes. The general strike of the rock strata is across the river and rocks are moderately inclined in the north direction. Weathering is quite active in this area. Soil cover is very less and grasses are present wherever small joints / fissures were found in the rocks. Prominent rock type included slates and phyllites common on the other side of the road, Bafliaz side of the bridge. The Karewa group, Quaternary in age, comprises of Sandstone, Siltstone and Conglomerates. Bafliaz formation lying below Karewa group comprises of Slates, Phyllites, volcanic and quartzites. In the absence of soil settling on this account is expected to be zero. Acid test had indicated absence of lime. The study area falls in the seismic zone five. Petrographic studies revealed the foundation rock being quartz rich meta sandstone. No ground water is encountered in the area while

drilling till the depth at which abutment is laid. Highest flood static level is only up to 2 meters from the current level of flowing water (Photograph). No danger is posed to foundation due to groundwater and scouring. UCS indicates rocks beings strong but fissures and joints needs artificial methods of consolidating. It was recommended that i) construct plain cement concrete structure to cover exposed broken rock, ii) grouting under the abutment will seal openings and control uplift and pore pressure and iii) strengthen vulnerable right side of the bridge by rock bolting.