

A GEOTECHNICAL NOTE ON THE FAILURE OF NORTHWESTERN PART OF BAHU FORT DURING RECENT RAINS, JAMMU DISTRICT, J&K

The Bahu Fort is situated on the left bank of Tawi River at an elevation of about 100 m from the river bed. It is was built by Raja Bahu Lochan about 800 years back. A part of Bahu fort collapsed on 18th Aug. 2013 after long spell of heavy rains. Geotechnical studies were carried out to ascertain the causes of failure and to suggest suitable remedial measures.

Regionally the area is occupied by unconsolidated boulder bed sandstone with occasional clay bands belonging to Upper Siwalik Group under cover of slope wash/slope debris material. Rock outcrops are exposed in the river bed only. The boulder bed comprises well rounded boulders, cobbles, pebbles embedded in sandy clayey matrix. The general trend of the rocks is NW-SE with gentle dip towards southwestern direction. In general, the area around the fort appears to be stable as no slide, deep erosional gullies and tensional cracks are seen.

The northwestern part of the fort area which has been collapsed is mainly located on unconsolidated boulder bed (Photo-1). This boulder bed is characterised by well rounded boulders, cobbles, pebbles of predominantly quartzite, sandstone, siltstone, granite gneiss and basic volcanics embedded in sandy clayey matrix.

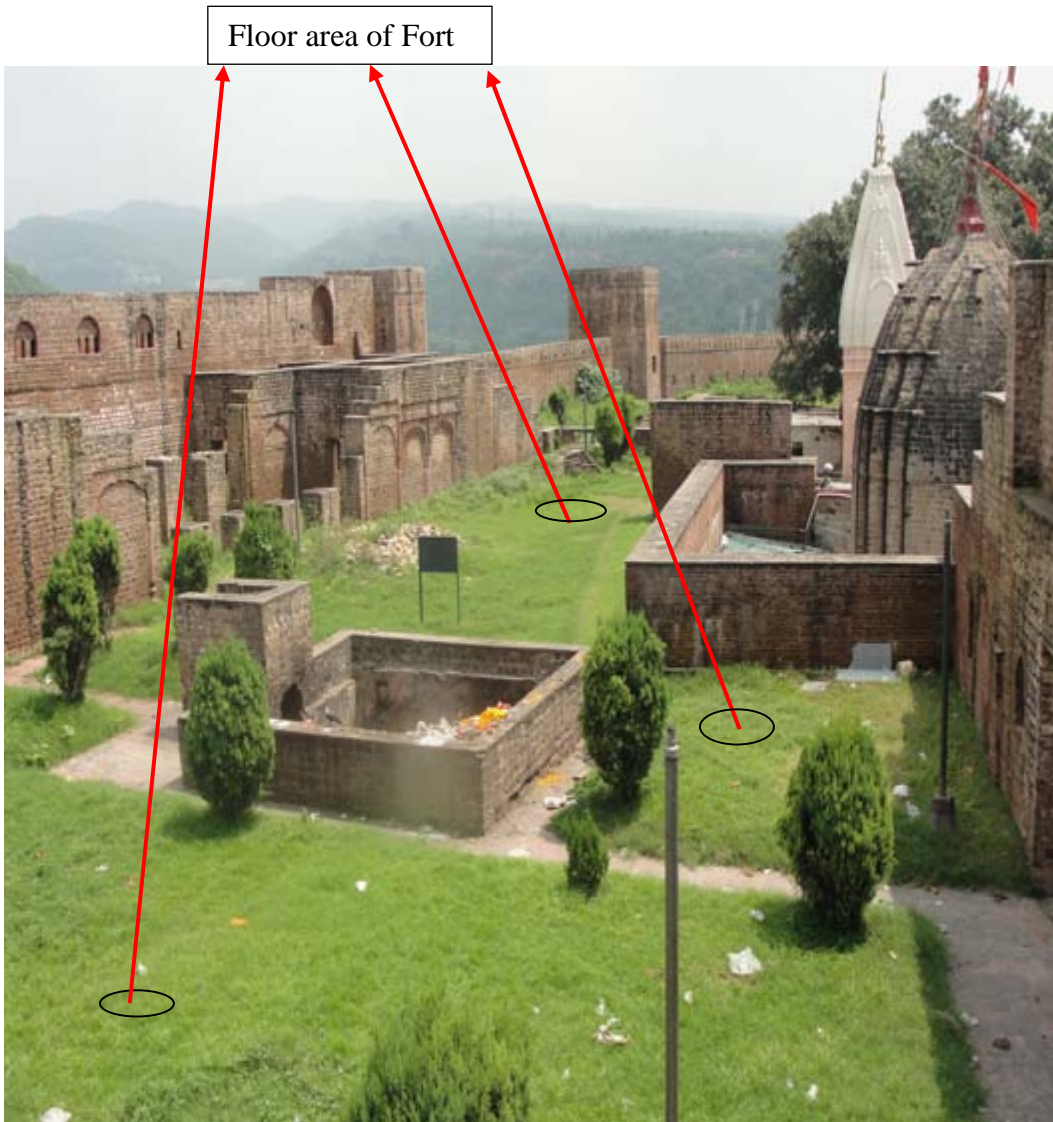
The fallen part of the fort appears to have renovated by concerned authorities in the near past which is evident from the rubble of the damaged wall which consists of cement concrete along with boulder/block of quartzites. The main causative factor of collapse seems to be the overloading of concrete masonry wall which has subsequently deteriorated because of over saturation of the foundation material due to long spell of heavy rains. Besides, due to improper drainage system within the fort premises, the rain water would have percolated in the foundation material resulting into foundation settlement.

In view of the above observations, it is strongly advised that **i)** the damaged concrete masonry wall should be off loaded immediately and the affected slope area should be left as such with deep rooted plantation, **ii)** Rebuilding of any type of protection wall should be totally avoided, **iii)** The floors of the fort area (Photo-2&3) which is presently covered by grass and debris material should be removed and adequate

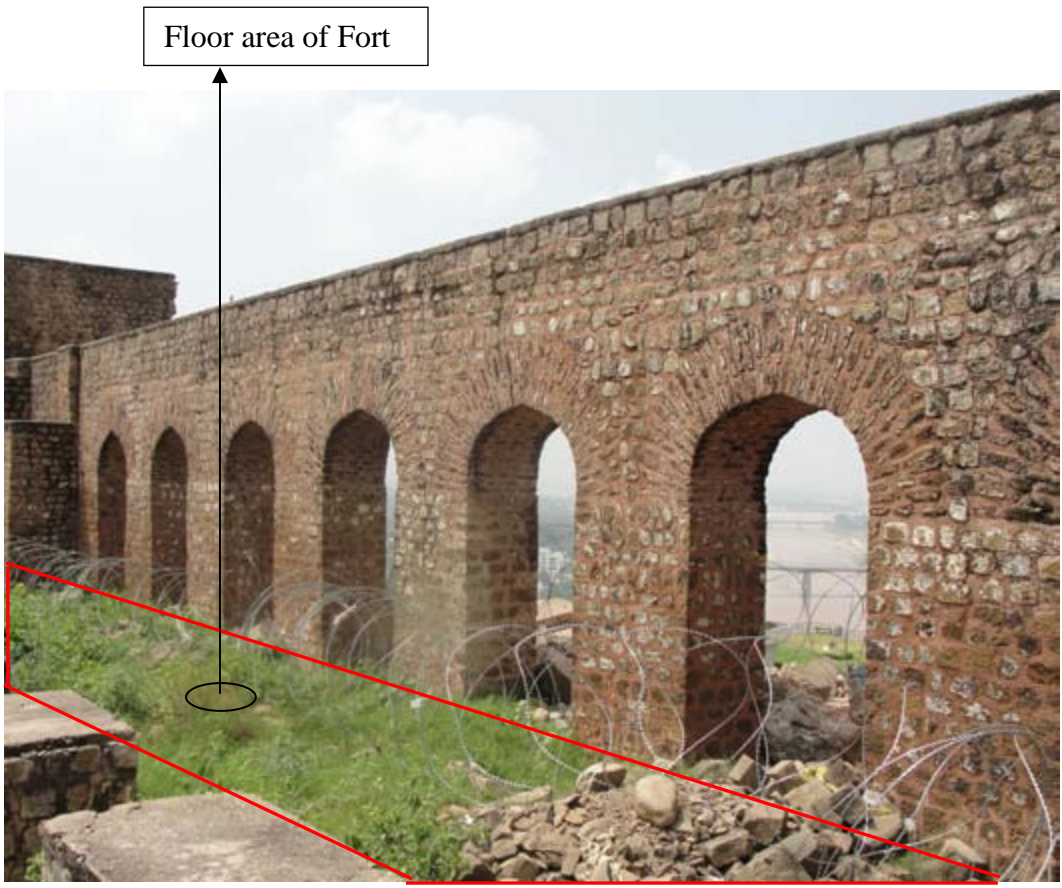
flooring work should be done to prevent any seepage towards valley side **iv)** Proper drainage arrangements in and around floors of the fort area should be made to divert rain water towards the southern slopes of the fort with proper lining **v)** the damaged toe part of original fort wall may be repaired manually with masonry work only.



(Fig.no-1)



(Fig.no-2)



(Fig.no-3)