

## Investigation of possible collapse of the wall of the underground munitions factory in Yoshimi Hyakuana historical site

Ryo Takahara<sup>1</sup>, Chiaki T. Oguchi<sup>2\*</sup>, Hisashi Aoki<sup>3</sup>, Yuichi S. Hayakawa<sup>4</sup>, Masayuki Seto<sup>2</sup>

<sup>1</sup>Dept. Eng., Saitama, <sup>2</sup>GRIS, Saitama University, <sup>3</sup>Daito University, <sup>4</sup>CSIS, Univ. Tokyo

Deterioration due to salt weathering is a small scale phenomenon in general. However, the weathering might cause a serious failure after rock strength reduction as a result of the weathering for a long time. This study attempted to rock stability analyses on both ceiling and side wall rocks of underground munitions factory in the historical site Yoshimi Hyakuana. In order to evaluate the rock strength, Equotip hardness test and point load test, because it could not make core specimens for uniaxial strength test using collected rock samples from the site. Stability of ceiling wall rocks was analyzed using converted values obtained from these field data and it resulted in fairly stable at present. With considering the recession of the wall due to salt weathering, the calculated stability is somehow reduced. During the salt weathering, the strength of outermost surface of the rock wall decreases significantly. Stability of the outermost rock-wall was examined and resulted in adequate threshold strength of pre- and post-exfoliation.

Keywords: salt weathering, tuff, stability analysis, rock strength, Equotip hardness test, Yoshimi Hyaku-Ana