

Discussion

Nailed Soil Structures: An Overview*

A. Sridharan†

The authors are to be complimented for their article on "Nailed Soil Structures: An Overview". Lot of efforts have been made to collate the information on the nailed soil structures in a concise manner for easy accessibility. Brief review of literature regarding successful applications of the nailing technique under various trying conditions is presented. However the paper has not included one of the earliest, probably the earliest nailed soil structure constructed in this country and published in the *Indian Geotechnical Journal* (Nagaraj et al., 1982).

For the first time in the country a deep excavation which is L-shaped with a plan area of 140 sq.m and to a depth of 8 m has been carried out under high ground water table condition using well designed soil nailing technique (Nagaraj et al., 1982). Nailing technique was adopted for carrying out deep excavation for housing of a furnace in an existing hanger of Hindustan Aeronautics Ltd., Bangalore. Conventional methods, such as strutted excavation, sheet piling with or without anchors, diaphragm walls by slurry trench method had to be dispensed with under various imposed constraints.

The ground water table was met at a depth of about 2 m and the excavation need to be carried out to 8 m depth. The insitu soil is essentially sandy silt with high permeability. The sequence of construction was essentially in steps of advancing the excavation by about 0.5 m and immediately strengthening the same by horizontal driving the reinforcing rods before the next stage of excavation is under taken. Since the excavation had to be carried out below ground water table, inspite of continuous

* Authored by C.P. Patra and P.K. Basudhar, published in *Indian Geotechnical Journal* (Vol.31, No.4, pp. 331-367)

† Professor, Department of Civil Engineering, Indian Institute of Science, Bangalore, India.

pumping it was necessary to prevent surface dislodging of the saturated soil mass. This was taken care by the use of wooden planks 2 m long and 22.5 cm wide with pre-drilled holes at 22.5 cm spacing along the line at the half of the width as skin elements. The skin elements also provided as templates for the reinforcement of 25 mm dia and 225 cm as length to be driven. Although it was possible to drive the rods of 225 cm length horizontally and manually with hammer, other methods of easily driving at a faster pace was possible with pneumatic guns working on a compressed air was found to be quite handy. By providing the sumps whose depths were always lower than 1m from the corresponding depths of excavation and continuously pumping the inflow of water, it was possible to handle the ground water problem satisfactorily. For details the paper by Nagaraj et al. (1982) be referred.

Reference

- NAGARAJ, T.S., SRIDHARAN, A. and ALEXANDER, M.V.P. (1982) : "In-situ Reinforced Earth: An Approach for Deep Excavation", *Indian Geotechnical J.* Vol.12, No.2, pp.101-111.