

NUMERICAL INVESTIGATION OF THE SOIL REINFORCING EFFECT ABOVE TUNNEL

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Due to increased urbanization, tunnels might pass and/or be found under or near existing buildings. Construction process of tunnels could result in a significant ground movement if care is not undertaken. Also structures that might be built above an existing tunnel might suffer from potential settlement. In this case, the increase in stresses might cause distress of the tunnel lining and results in excessive deformation. Thus, it is crucial that an improved knowledge about the interaction between surface loads and tunnels is gained in order to reduce potential risks and hazards. The interaction between the surface footings and tunnels depends upon several factors including the relative dimensions of the surface footings and tunnels as well as depth and eccentricity of the proposed tunnel to the surface loads. In order to reduce the effects of surface loads on the existing tunnel many precautions must be undertaken in the surface construction process. One of the major objectives needed to be gained before superstructures construction is improving the characteristics of the soil between surface footing and the existing tunnel to increase its bearing capacity and reduce its settlement, to attenuate the pressure on the tunnel. One of the techniques is soil reinforcing with Geosynthetic. In this paper, 3D nonlinear models have been used to simulate the behaviour of the soil, the tunnel and the reinforcing. The numerical investigations have been carried out to assess the effect of different factors affecting the system response with special focus on the influence of reinforcing width, layers numbers and eccentricity of the proposed tunnel to surface loads.

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