Analysis of Buried Pipes using Computational Fuzzy System

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Abstract

An appropriate estimation of buried pipe deformation is a major concern to designers in geotechnical, construction and civil engineering and traditional methods are unable to estimate this phenomenon accurately. Numerical methods may be powerful tools to cope with the complexity of this fact. This paper develops a fuzzy set based method for the analysis of Buried Pipe's deflection based on laboratory tests of small diameter pipes buried in sand which were subjected to repeated loading to simulate the vehicle loads. The experimental data from tests show that the vertical diametrical strain (VDS)(defined as the reduction in vertical diameter divided by original vertical diameter) and settlement of soil surface (SSS) significantly are depended on relative density of the soil, height of embedment depth of pipe and amplitude of applied stress, therefore the system is obtained to consider the above parameters. The outputs involve vertical diametrical strain and soil surface settlement. The results indicate that, this system provides deep knowledge of buried pipe analysis and also provide new insight in to the significance of some influencing input variables.

Keywords. Fuzzy system, intelligent techniques, buried pipe, vertical diametrical strain, soil surface settlement

References