

EVALUATION OF UNSATURATED SOIL RESPONSE UNDER SEISMIC LOADING

Farshad FOULADI

*M.Sc. Student, Razi University, Kermanshah, Iran
f.fouladi@pgs.razi.ac.ir*

Mahnoosh BIGLARI

*Assistant Professor, Razi University, Kermanshah, Iran
m.biglari@razi.ac.ir*

Iman ASHAYERI

*Assistant Professor, Razi University, Kermanshah, Iran
i.ashayeri@razi.ac.ir*

Keywords: Seismic Response Analysis, Matric Suction, Unsaturated Soil Profile, DEEPSOIL

ABSTRACT

The influence of matric suction as a stress state variable of unsaturated soil on shear modulus and also nonlinearity of soil has been recognized in several researches. Therefore, it is clear that presentation of seismic response of unsaturated soil profile with consideration of the suction effect provides a more realistic response of the soil profile. The aim of this study was to evaluate and validate the impact of suction on ground response analysis by available two unsaturated dynamic models in the literature that can predict shear modulus at very small strain and generate G/G_0 , D - curves with considering of suction. The paper presents a parametric study of linear, equivalent linear and nonlinear site response analysis of the imaginary soil profiles in terms of the amplification function and pseudo acceleration-displacement response spectra and obviously show major effects of suction on the mentioned parameters.

INTRODUCTION

The basis of one-dimensional ground response analysis is a presentation of the procedure by using simplifications avoids of wave scattering. In this method, SH is the input wave that radiated from rock to soil, because when the wave traveling from one medium to another, produces itself exclusively. Moreover, the soil layers that overlaying the bedrock must be parallel with both themselves and bedrock direction. Eventually the response of a point on the bedrock will be transferred to the surface of the soil profile and it is assumed that the response is similar to all of the site points.

Assumptions that soil is either dry or saturated, often is not consisting with reality and in many engineering problems, however, a soil is partially saturated (degree of saturation is between 0 to 100 percent).

The Influence of matric suction as a stress state variable of unsaturated soil on shear modulus and also nonlinearity of soil has been recognized in several researches. So it is clear that presentation of seismic response of unsaturated soil profile with consideration of the suction effect provides a more realistic response of the soil profile.

A research of d'Onza et al. (2008) is the pioneer investigation in this field. The investigation is the basis of linear ground response analysis by considering the soil suction on the shear wave velocity or