



# Nonlinear Behavior Analysis of SFRC Foundation Considering Homogeneous and Inhomogeneous Soil Interactions

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**Abstract.** Current structural design and analysis commonly use numerical simulation. Interactive problems often use this method to express the behavior of different types of structures when working together subject to external loads. This study shows the relationship between compression forces and displacements of a slab foundation that are directly interactive with inhomogeneous soil when using the stress-strain curve of steel fiber reinforced concrete material proposed by Barros and Figueiras [1]. The obtained results are better than the previous study of Vaskova and Čajka [3] when both experimental test results are compared. Otherwise, only using one type of element for both the foundation and the soil does not affect this interaction problem. The material model is an essential part of the simulation, and the problem should consider nonlinear behavior analysis.

**Keywords:** ANSYS, Finite element analysis, Homogeneous soil, Inhomogeneous soil, Steel fiber reinforced concrete, Nonlinear analysis.

## 1 Introduction

Nowadays, new materials are being used widely for foundation structures. Steel fiber reinforced concrete (SFRC) is a composite material which has fibers dispersed randomly in concrete. There are three types of fibers: plain, straight, and round. Round fibers are the most common type with their diameter ranging from 0.25 to 0.75 mm. The use of such material has been suggested for many structural applications, with or without traditional internal reinforcement. The use of SFRC is, thus, particularly suitable for slab foundation structures when they are subjected to compression loads over the serviceability limit state regarding bending and shear, and researched characteristics in the study [1].

The substructure and subsoil are interdependent. Therefore, the effect of the underlying soil loads on the upper structure cannot be neglected. In the analysis, it is neces-