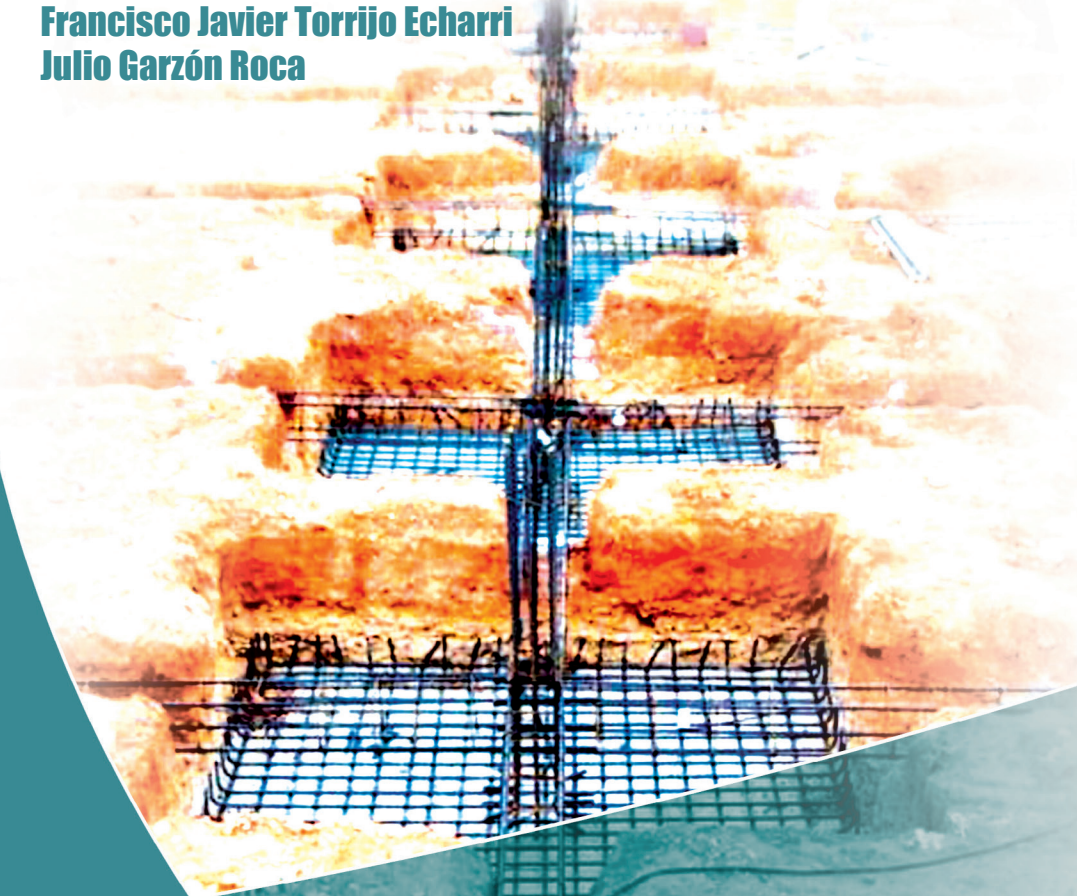




Shallow and deep foundations in geotechnical engineering

Francisco Javier Torrijo Echarri
Julio Garzón Roca



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UNIVERSITAT POLITÈCNICA DE VALÈNCIA

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Chapter 1

Introduction

1.1. Foundations

The loads on infrastructures¹ and their own weight can be seen in the engineering design as a set of forces that need to be transmitted to the ground, which will be consequently affected by the changes in stresses and whose response may result in the main issue of the stability of the structure. This is achieved by means of a “support system”, composed of a structural transitional element and the ground itself, which interact with each other. For the selection and design of that support system, safety and trust criteria, similar to those used when designing other engineering elements, must be applied, guaranteeing the stability, safety and functionality of the infrastructures during their service life.

The loads moving from an infrastructure to the support ground cross the contact between two media whose mechanical properties are (almost always) drastically different. To achieve compatible conditions in stresses and deformations, the structural transition element needs to be designed depending on the properties of both media.

In addition, the direct support of a “rigid” infrastructure on the ground would produce excessive deformations, which may be non-tolerable for the infrastructure. To keep an infrastructure in service, an intermediate element capable of absorbing and reducing

¹ The term “infrastructure” is used along this text to refer, in a broad way, all kind of civil engineering works, including road and railways and their auxiliary works (such as embankments and excavations) as well as harbors, buildings and structures in general.

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