

# The Mechanics Of Residual Soils: Unlocking the Secrets to Ground Stability

## Residual & Transported Soil.



Residual soils are a fascinating area of geotechnical engineering that play a crucial role in understanding ground stability. Unlike transported soils, which have been carried by the forces of nature from their original location, residual soils remain at the site of their formation. These soils often have unique properties and behaviors that make them challenging to study and predict. In this article, we will delve into the mechanics of residual soils, explore their formation, properties, and discuss their implications for various engineering projects.

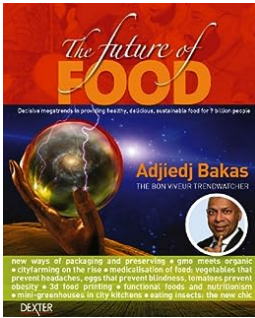
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**Mechanics of Residual Soils** by Adjiedj Bakas (2nd Edition)

★★★★★ 5 out of 5

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## Formation of Residual Soils

Residual soils are formed through a process known as weathering, where the parent rock undergoes physical and chemical breakdown due to exposure to atmospheric and environmental conditions. This weathering process can take millions of years and is influenced by factors such as temperature, moisture, topography, and the mineral composition of the parent rock. As the rock gradually breaks down, the resulting particles form the residual soil that remains in place.

## Properties of Residual Soils

Residual soils are known to possess unique properties that differ from transported soils. Some of the key characteristics include:

- **Cohesiveness:** Residual soils often exhibit a certain degree of cohesion, which refers to their ability to stick together.
- **Strength:** These soils can have varying degrees of shear strength, with some being quite stable while others being highly susceptible to failure.
- **Uniformity:** Residual soils tend to have a relatively uniform composition throughout their depth, unlike transported soils which may show distinct layers.

- **Heterogeneity:** Despite their uniformity, residual soils may exhibit variations in properties due to their formation process, resulting in different layers with different engineering properties.

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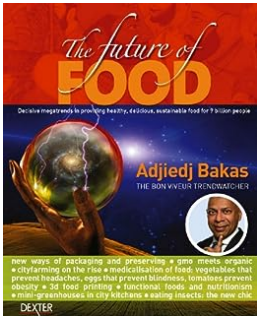
## The Impact on Engineering Projects

The unique properties of residual soils have significant implications for engineering projects, particularly those involving foundation design and construction. Engineers must take into account the following factors:

- **Slope stability:** Residual soils can be prone to landslides and slope failures due to their shear strength characteristics. Understanding the mechanics behind these failures is critical in designing structures on slopes.
- **Settlement:** The compressibility of residual soils can lead to differential settlement issues, where different areas of a structure experience varying degrees of subsidence.
- **Bearing capacity:** The potential for the load-bearing capacity of a foundation to be compromised by weak layers within a residual soil deposit needs to be carefully assessed during foundation design.

Residual soils offer a fascinating insight into the intricate world of geotechnical engineering. By understanding their mechanics, engineers can make informed decisions when it comes to designing and constructing structures on residual soil deposits. Through comprehensive site investigations, including laboratory testing and geotechnical analysis, the potential risks associated with residual soils can be better managed, ensuring the safety and stability of our built environment.

So the next time you encounter a construction project involving residual soils, remember the valuable lessons that the mechanics of these soils teach us. Their study and understanding are essential for the successful completion of any engineering endeavor.



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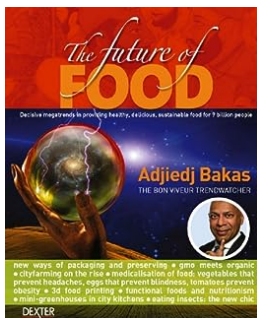


Residual soils are found in many parts of the world and are used extensively as construction materials for roads, embankments and dams, and to support the foundations of buildings, bridges and load-bearing pavements. The characteristics and engineering properties of residual soils can differ significantly from those of the more familiar transported soils. The fact that residual soils occur often in areas with tropical and sub-tropical climates and (extensively) in semi-arid climates, adds another dimension to their engineering performance, that of unsaturation.

Although there are many books that deal with the mechanics of soils, these are based mainly on the characteristics and behaviour of saturated transported soils. The first edition of this book was the first book to be written specifically about the mechanics of residual soils. The book was prepared by a panel of authors drawn from the Technical Committee on Tropical and Residual Soils of the International

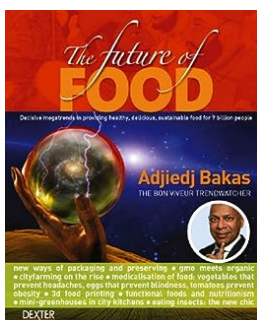
Society for Soil Mechanics and Foundation Engineering. It was written as a practical professional guide for geotechnical engineers working with residual soils.

The second edition has retained the valuable information contained in the first edition. The present editors and authors have extensively revised and augmented the content to bring it completely up to date, adding significantly to the sections on unsaturated soil mechanics and expanding the range and number of instructive case histories. Furthermore, sections on pedocretes, dispersive soils and karst have been added.



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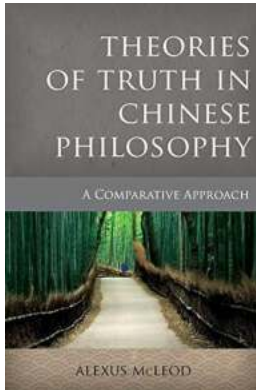
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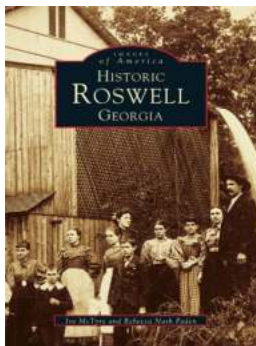
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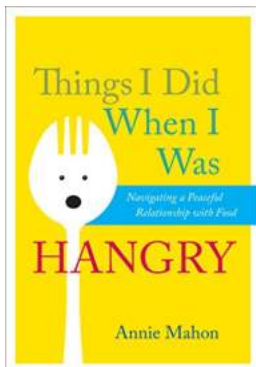
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