



## Geotechnical Engineering

# Leaders in Geotechnical Engineering

Geotechnical engineering is different from other fields of engineering as it mostly deals with naturally occurring materials and geometries which are unknown whereas, in the other fields engineers deal with a world almost entirely of their making. These natural conditions must be inferred from sometimes limited and costly investigation. The key uncertainties resulting from this are:

- Accuracy and completeness with which subsurface conditions are known
- Resistances that the materials will be able to mobilise

The uncertainties associated with the models and analytical tools at the disposal of the geotechnical design engineer also need to be contended with.

SMEC assists in the reduction of detrimental consequences related to geotechnical design by providing geotechnical engineering and scientific investigation services.

SMEC South Africa offers a holistic geotechnical service:

- Surface and subsurface investigations
- In-house laboratory testing
- Geotechnical design solutions
- Construction monitoring and quality assurance (QA)

# Our Expertise

SMEC South Africa incorporates the theory of soil and rock mechanics to ensure economic and sustainable designs that are used in the construction of simple to highly complex engineering infrastructure. We focus on three most critical aspects of geotechnical engineering:

## Design reliability under conditions of uncertainty

SMEC's professional staff use multi-disciplinary approaches to understand behaviour of the soil and structure interaction to derive a sustainable solution.

## Geotechnical risk assessment and management

SMEC's professional staff uses mathematical modelling, engineering judgement, sensitivity analysis and observations to assess and lower the risk.

## Sustainability

Sustainability includes the design life of the structure, cost of the structure and environmental consideration of the surroundings.

## Computer modelling

SMEC South Africa uses dedicated commercial software to create models, which facilitate communication and inform decision making and analysis.

## Laboratory testing

Laboratory testing of soil and rock samples are undertaken under direct principal supervision by wholly owned SMEC South Africa subsidiary companies Soillab and Rocklab, which are SANAS accredited.

## Key service differentiators

The Geotechnics value added services include:

- Numerical modelling
- Critical state design
- Risk management on dolomite land
- Holistic geotechnical service from inhouse surface and subsurface investigations, laboratory testing and engineering design
- Knowledge or existing database of geo-referenced geotechnical reports, giving an easily accessible database of detailed, localised conditions that higher-level sources cannot identify
- ISO 9001 and ISO 14001 compliance

## Project lifecycle

- Conceptual and feasibility studies,
- Preliminary and detailed design
- Procurement documentation and administration
- Construction monitoring and management
- Post construction monitoring

## Our Core Competencies

SMEC offers a range of geotechnical analyses and engineering design services, which are undertaken in compliance with technical standards, codes of practice and relevant legislation. These services include the design of:

- Shallow foundation systems
- Deep foundation systems
- Retaining and lateral support structures
- Mechanically stabilised earth systems
- Embankment designs (bulk earthworks)
- Ground improvement, including stabilisation of dolomitic land
- Slope stabilisation
- Erosion control systems
- Surface and subsurface drainage systems



# Our Global Footprint



**40+**  
Countries



**120+**  
Offices



**13,500+**  
Employees

SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.



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