

# 3rd 5-Day Course in **APPLIED GEOPHYSICS in ENGINEERING**

presented by  
Riga Technical University and Geophysik GGD mbH

## INTRODUCTION

Many engineering and construction projects require detailed knowledge of the subsurface conditions. Weak layers and subsurface excavations can impose a risk on buildings and roads. Waste disposal sites need a geological barrier to prevent contamination of aquifers. The drilling of exploration and production wells can be optimized when hazardous locations are avoided and the most promising site can be selected. Some projects of this kind even require a site characterization before political approval for the construction start can be obtained.

In order to find suitable structures for a given problem or to determine possible risks of an existing site a detailed geoscientific and interdisciplinary approach is most useful. The investigation methods must be adapted to the geological and hydrogeological conditions at the site. Not only the structures below the location, but also the surrounding area have to be examined. Among Remote Sensing, Geology, Hydrogeology and Geochemistry, **GEOPHYSICS** plays an important role, for example in the investigations of waste disposal sites and contaminated areas based on a multi-barrier concept.

This course will introduce different geophysical methods which are applicable solely or in combination, to solve engineering and environmental problems. The mathematical fundamentals will be explained shortly for each method as it is necessary for an understanding of the results. The usual survey practice, the applied processing flow, the achievable accuracy and the geological interpretation of the geophysical results and its presentation will be discussed. Several aspects of the required personnel and technical resources as well as of measures for quality assurances will be considered. Case histories of geophysical investigations in environmental engineering and exercises to establish the knowledge gained will complement this course.

## WHO SHOULD ATTEND

This course is intended for project managers, engineers, geologists and geophysicists who are involved in a wide range of subsurface related projects. These can include (but are not limited to) the design, construction or rebuild of infrastructure (buildings as well as roads, railroads, tunnels, waste disposal sites), exploration projects (i.e. water, shallow geothermal energy) and environmental issues. For all of these, geophysics can provide powerful exploration tools.

At the end of the course the participants should be able to decide which geophysical methods are suitable for solving specific geological, hydrogeological or geotechnical questions and to assess the obtained geophysical results and their geological interpretation.

A basic mathematical background and a physical understanding are necessary.

## METHODS

Geophysics provides the distribution of physical parameters of the subsurface by surveys at the earth's surface without destroying soil formations. Geophysical methods are applied to determine a spatial model of the underground, to locate fault zones, to investigate the regional groundwater system, or to derive lithological parameters.

- DC resistivity
- Electromagnetics
- Magnetics
- Seismics
- Geo-Radar
- Gravity

## OUTLINE

- Principle of the method
- Mathematical fundamentals
- Instruments
- Survey practice
- Processing and interpretation
- Economics, survey crew, equipment and time scheduling
- Quality assurance
- Examples and Exercises

## COURSE INFORMATION

Location:	Riga Technical University
Date:	February 11-15, 2008
Course Fee:	free for Students of Riga Technical University; 200 EUR for other participants
Certificate:	15 EUR
Language:	English
Lecturer:	Dipl.-Geophys. Jakob Schwabe Dipl.-Geophys. Dr. Tobias Karp Dipl.-Geophys. Walter Olgemann

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