

water-groundwater-ecology relations in delta areas and the ground water related vulnerability of buildings and infrastructure foundations.

The course leaders are supported by David Waggoner (Waggoner & Ball architects, New Orleans and a community leader during the reconstruction of New Orleans after Hurricane Katrina) and Jaap Bijmagne (damage expert, Deltares).

COSTS

The costs of this course are \$ 850. This will include lectures, field trip and a post-field-trip dinner, and all lunches (Thursday, Friday and Saturday). If desired, we can advise you on accommodation options in New Orleans.

Registration

For questions and registration, please send an e-mail to roelof.stuurman@deltares.nl



SOFT SOILS NEED SOLID GOVERNANCE

a 3-day subsidence management course

NEW ORLEANS, 21-22-23 NOVEMBER 2013



AIM

The course aims at informing relevant stakeholders and problem owners such as policy makers, politicians, companies on subsidence in megacities. Topics that will be addressed include the causes of subsidence, the consequences (damage, loss of investments), and possible ways to cope with subsidence. The set-up of the course enables interactions with experts during the field trip and exchange of best practice solutions among a (global) group of delegates from subsiding cities.

TARGET GROUP

The course is designed for concerned government employees, such as urban managers, policy makers, and urban planners. We want to find people that want to improve the use of the urban subsurface and water management and to limit subsidence rates towards a sustainable acceptable level.

KEY WORDS

Subsidence, Urban environment, subsurface, organic soils, solutions, problem solving, groundwater, surface water.

PROGRAM

Thursday, 21 November: EXPERIENCING SUBSIDENCE DAMAGE:

Field trip

The course will start with a field trip in the urban area of Greater New Orleans and the surrounding wetland areas. We will experience the damaging results of subsidence and discuss with local stakeholders how they deal with this. During the field trip we will be accompanied by world experts in subsidence processes. We will show the results of subsidence on buildings and infrastructure. We will apply some shallow and simple borehole tests, to understand subsurface and groundwater characteristics. During the field trip there will be ample opportunity to discuss all aspects of subsidence: the processes, monitoring, measures to slow down subsidence, building on vulnerable areas, salinization due to subsidence, dike safety, etc.

Friday, 22 November: YOU CANNOT MANAGE WHAT YOU DON'T KNOW: Introduction to subsidence processes

During the morning the scientific background of subsidence will be presented, based on state-of-the-art scientific knowledge. Subsidence results from different processes, i.e. groundwater or oil/gas extractions, loading, drainage etc. After



this morning you know the ins and outs on subsidence processes, including its spatial and temporal characteristics. You will understand the impact it has on Delta cities.

During the afternoon the consequences of subsidence will be discussed. How does damage develop? How can we determine, quantify and monitor damage? Who is currently paying the costs for subsidence?

Saturday, 23 November: DEALING WITH SUBSIDENCE: Subsidence and governance

Although subsidence may be recognized as a serious problem, governments often hesitate to take action. However, doing nothing will create serious risks for damage in future (i.e. flooding). In many cities, subsidence is often larger than the sea-level rise caused by climate change. The first step is therefore to raise more awareness. It is about understanding the processes in the subsurface and communicating these with a broad audience. We will have to come up with plans for existing urban areas, and work to improve future urban developments. The main challenge will

be to organize subsurface and water management in subsiding cities in a sustainable way. During the afternoon, we will focus on solutions. Which technical solutions are available, such as raising construction sites, using light-weight building material, limit groundwater extraction and limit drainage? How can we adapt to future subsidence in vulnerable locations, in spatial planning, in building, and by collecting and using required data? How can we build structures in a subsidence-proof way, from foundation to design?

VENUE

The subsidence course will be organized at Tulane University, well connected to the city center (French Quarter) by traditio-

nal streetcar. The French Quarter, also known as the Vieux Carré, is the oldest neighborhood in the city of New Orleans. When New Orleans (La Nouvelle-Orléans in French) was founded in 1718 by Jean-Baptiste Le Moyne de Bienville, the city was originally centered on the French Quarter, or the Vieux Carré ("Old Square" in French) as it was known then. While the area is still referred to as the Vieux Carré by some, it is more commonly known as the French Quarter today, or simply "The Quarter." Although called the "French" Quarter, most of the present day buildings were built under Spanish rule and show Spanish colonial tastes. The district was affected relatively lightly by Hurricane Katrina in 2005, as compared to other areas of the city and the greater region. Because the French Quarter is built on sandy deposits subsidence is low.

ORGANIZATION

The course is organized by the Water Institute of the Gulf (Baton Rouge, Louisiana), Tulane University (New Orleans, Louisiana) and Deltares Research Institute (The Netherlands). The course leaders are:

Torbjörn Törnqvist, Professor and Chair Department of Earth and Environmental Sciences, Tulane University;

Mead Allison, Director of physical processes & sediment system at the Water Institute of the Gulf. Professor at the Department of Earth and Environmental Sciences, Tulane University;

Devin Galloway, senior hydrogeologist at USGS and chairman of the UNESCO Subsidence Committee;

Gilles Erkens, (Deltares Research Institute, University Utrecht, PhD), subsidence expert and geologist. Worked in peat lands around the world on subsidence;

Roelof Stuurman, (Deltares Research Institute), more than 30 years experience in applied research and consultancy about complex subsurface-surface

