

Introduction to Drilling Engineering and Well Design

Speaker: Gerhard Thonhauser, Montanuniversität Leoben



Drilling engineering starts with developing an understanding of the geological setting and boundary conditions where the well is going to be drilled. Based on combining knowledge about the drilling environment and combining the well requirements defined by geologist, reservoir and/or production engineers the well is then designed by the drilling engineer. The well design process includes the planning of the well path to reach a certain subsurface target from a defined surface location together with the design of the well construction with casing and cementing program. The drilling engineer selects a proper mud system and the required drill string and drilling tools and identifies ideal operating parameters to drill the well. Based on the load and capacity requirements derived from the well design an adequate drilling rig is selected to perform the task at hand.

This tutorial gives a general introduction to the concepts and terminology used to drill deep wells for oil- and gas production, as well as to produce water or for geothermal applications. It explains the geological boundary conditions and relevant properties of rock. Furthermore the drilling process is explained in a step by step manner. Process knowledge is then combined with a review of the type of surface and downhole equipment, which is typically used to drill state of the art wells.

About the speaker: Gerhard Thonhauser has 15 years of experience providing the petroleum industry with the evaluation, analysis and management of drilling and well related data. Thonhauser is founder of TDE Thonhauser Data Engineering GmbH servicing the international industry with drilling performance analysis and benchmarking, engineering and software development.

Since 2003 Thonhauser is Professor at the Montanuniversität Leoben, Austria, and holds the Chair of Drilling and Completion Engineering. His areas of research and development include “Drilling Monitoring and Diagnoses” combining modeling, advanced monitoring and sensing, and drilling analysis to optimize and automate the drilling process and to improve learning and knowledge management in drilling organizations.

Since 2009 Gerhard Thonhauser is the head of “Environmental Friendly Drilling Systems” initiative in Europe focusing on drilling and completion technologies with “Zero Harmful Environmental Impact”.

Thonhauser holds a Masters and PhD degree in Petroleum Engineering from the University of Leoben, Austria. Thonhauser is an active member of SPE.