COURSE OVERVIEW DE0856
Drill String Design & Optimization

Course Title
Drill String Design & Optimization

Course Date/Venue
Please refer to page number 3

Course Reference
DE0856

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and, highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

Drill string is just as important as any other tool in the well and proper designing of the appropriate one will save time and money. There are many factors to be considered when designing the correct drill string, including: well plan, casing program, rig capacity, drilling parameters and formation limits among others.

Drill string design for high angle wells should be optimized for all required functions of the drill string. Optimum drillstring design requires a thorough review of well design and objectives in order to rank in importance the demands of a drill string. Practical considerations for drill string design for high angle wells and systematic approaches to the design process are presented in this state-of-the-art course.

This course is designed to provide participants with an up-to-date overview of the drill string designs and optimization as well as the knowledge of how to avoid operations problems and wear on equipment. BHA design concepts, optimization, and drilling hydraulics will be covered with an emphasis on practical and safe operating procedures. Industry standards will be used as training aids to supplement the presentation material, as well as to provide participants with a thorough understanding of the drill string component operating limits and practices.

By the end of the course, participants will understand the steel and submerge tubulars; the mechanical properties of steel and the basic concepts, strength and deformation; the minimum and maximum yield stress of hook's law; the axial forces and buckling in submerged tabulars of buoyancy; the API RP7G for drill stem design and operating limits; the drill string and BHA failure prevention; the drill stem design, drill pipe specifications and connection; the bottom hole assembly (BHA); the drill string dynamics; the BHA selection and design; and the bending strength ratio, stiffness ratio and stress relief features. The course will also cover the BHA design for DD applications; the low-angle and high-angle design applications; the torque, drag and casing wear mitigation; the vibration monitoring and avoidance; and the handling, inspection, troubleshooting and maintenance of drill string.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain in-depth knowledge on drill string design
- Discuss steel and submerge tubulars including mechanical properties of steel and basic concepts, strength and deformation
- Recognize the minimum yield stress and maximum yield stress of 'Hook's Law' as well as the axial forces and buckling in submerged tubulars of buoyancy
- Explain the API RP7G for drill stem design and operating limits
- Refresh underlying physics of drill string failures and mechanical properties of drill string materials
- Carryout drill string and BHA failure prevention, drill stem design and drill pipe specifications and connection
- Describe bottom hole assembly (BHA) and drill string dynamics
- Illustrate BHA selection and design cost-effective BHAs as well as match them to the bit and identify the DC and HWDP specs and properties and BHA design process
- Place the drill string design process in context with other planning and operational considerations
- Clarify performance properties of drill string components and how to apply design margins
- Recognize the bending strength ratio, stiffness ratio and stress relief features
- Employ the BHA design for DD applications as well as low angle and high-angle design application
- Gain specific application experience by analyzing common load cases for both near-vertical and high-angle situations that includes tension loads, torque loads, combined tension-torque loads, fatigue loads and buckling loads
- Recognize the basis for industry software design tools, including torque and drag, casing wear, and hydraulics
- Identify drilling tools and operational practices to reduce both torque and drag and casing wear
- Illustrate torque, drag and casing mitigation, vibration monitoring and avoidance

- Diagnose and mitigate vibration to reduce drill string damage and failure
- Handle, inspect troubleshoot and maintain drill string in a professional manner
- Optimize each drill string inspection program using the latest industry standards

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of drill string design for drilling engineers, drilling supervisors and superintendents.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Date/Venue

Session(s)	Date	Venue
1	May 17-21, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	July 05-09, 2026	Pierre Lotti Meeting Room, Movenpick Hotel Istanbul Golden Horn, Istanbul, Turkey
3	August 31-September 04, 2026	Ruben Boardroom, The Rubens at The Palace, Buckingham Palace Road, London, United Kingdom
4	September 13-17, 2026	Meeting Plus 9, City Centre Rotana, Doha, Qatar
5	September 28-October 02, 2026	Salon Expo, NH Hotel Plaza de Armas, Seville, Spain
6	November 29-December 03, 2026	Meeting Room 4, Four Seasons Hotel Cairo at Nile Plaza, Corniche El Nil, Garden City, Cairo, Egypt
7	January 10-14, 2027	Meeting Plus 9, City Centre Rotana, Doha, Qatar
8	February 07-11, 2027	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
9	March 21-25, 2027	Pierre Lotti Meeting Room, Movenpick Hotel Istanbul Golden Horn, Istanbul, Turkey

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Konstantin Zorbalas, MSc, BSc, is a **Senior Petroleum Engineer & Well Completions Specialist** with over **25 years** of **offshore** and **onshore** experience in the **Well Completion Design**, **Well testing**, **Well Testing Analysis**, **Well Cementing**, **Oil** & **Gas**, **Refinery** & **Petrochemical** industries. His wide expertise includes **Workovers & Completions**, **Petroleum Risk & Decision Analysis**, **Acidizing Application** in **Sandstone** & **Carbonate**, **Stimulation Operations**, **Reserves Evaluation**, **Reservoir Fluid Properties**, **Reservoir Engineering & Simulation Studies**, **Reservoir Monitoring**, **Artificial Lift Design**, **Gas Operations**, **Workover/Remedial Operations** & **Heavy Oil Technology**, **Applied Water Technology**, **Oil & Gas Production**, **X-mas Tree** & **Wellhead Operations** & **Testing**, **Artificial Lift Systems** (**Gas Lift**, **ESP**, and **Rod Pumping**), **Production Optimization**, **Sand Control**, **PLT Correlation**, **Slickline Operations**, **Acid Stimulation**, **Production Logging**, **Project Evaluation** & **Economic Analysis**. Further, he is actively involved in **Project Management** with special emphasis in production technology and field optimization, performing conceptual studies, economic analysis with risk assessment and field development planning. He is currently the **Senior Petroleum Engineer & Consultant** of **National Oil Company** wherein he is involved in the mega-mature fields in the Arabian Gulf, predominantly carbonate reservoirs; designing the acid stimulation treatments with post-drilling rigless operations; utilizing CT with tractors and DTS systems; and he is responsible for gas production and preparing for reservoir engineering and simulation studies, well testing activities, field and reservoir monitoring, production logging and optimization and well completion design.

During his career life, Mr. Zorbalas worked as a **Senior Production Engineer**, **Well Completion Specialist**, **Production Manager**, **Project Manager**, **Technical Manager**, **Technical Supervisor** & **Contracts Manager**, **Production Engineer**, **Production Supervisor**, **Production Technologist**, **Technical Specialist**, **Business Development Analyst**, **Field Production Engineer** and **Field Engineer**. He worked for many **world-class oil/gas companies** such as **ZADCO**, **ADMA-OPCO**, **Oilfield International Ltd**, **Burlington Resources** (later acquired by **Conoco Phillips**), **MOBIL E&P**, **Saudi Aramco**, **Pluspetrol E&P SA**, **Wintershall**, **Taylor Energy**, **Schlumberger**, **Rowan Drilling** and **Yukos EP** where he was in-charge of the **design and technical analysis** of a gas plant with capacity **1.8 billion m3/yr gas**. His achievements include **boosting oil production 17.2% per year** since 1999 using **ESP** and **Gas Lift systems**.

Mr. Zorbalas has **Master** and **Bachelor** degrees in **Petroleum Engineering** from the **Mississippi State University**, **USA**. Further, he is an **SPE Certified Petroleum Engineer**, **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), an active member of the Society of Petroleum Engineers (**SPE**) and has numerous scientific and technical publications and delivered innumerable training courses, seminars and workshops worldwide.

Course Fee

Dubai	**US$ 8,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Istanbul	**US$ 8,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
London	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Doha	**US$ 8,500** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Seville	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Cairo	**US$ 8,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Steel & Submerger Tubulars***
0930 – 0945	*Break*
0945 – 1100	***Mechanical Properties of Steel & Basic Concepts - Strength & Deformation***
1100 – 1230	***Hook's Law - Minimum Yield Stress - Maximum Yield Stress***
1230 – 1245	*Break*
1245 – 1420	***Buoyancy - Axial Forces & Buckling in Submerged Tubulars***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Introduction to API RP7G for Drill Stem Design & Operating Limits***
0930 – 0945	*Break*
0945 – 1100	***Drill String & BHA Failure Prevention***
1100 – 1230	***Drill Stem Design***

1230 – 1245	Break
1245 – 1420	**Drill Pipe Specifications & Connections**
1420 – 1430	**Recap**
1430	Lunch & End of Day Two

Day 3

0730 – 0930	**Bottom Hole Assembly (BHA)**
0930 – 0945	Break
0945 – 1100	**Drillstring Dynamics**
1100 – 1230	**BHA Selection & Design – DC & HWDP Specs & Properties – BHA Design Process**
1230 – 1245	Break
1245 – 1420	**Bending Strength Ratio – Stiffness Ratio – Stress Relief Features**
1420 – 1430	**Recap**
1430	Lunch & End of Day Three

Day 4

0730 – 0930	**BHA Design for DD Applications**
0930 – 0945	Break
0945 – 1100	**Low-Angle Design Applications**
1100 – 1230	**High-Angle Design Applications**
1230 – 1245	Break
1245 – 1420	**Torque, Drag & Casing Wear Mitigation**
1420 – 1430	**Recap**
1430	Lunch & End of Day Four

Day 5

0730 – 0930	**Vibration Monitoring & Avoidance**
0930 – 0945	Break
0945 – 1100	**Drill String Handling & Inspection**
1100 – 1230	**Drill String Troubleshooting**
1230 – 1245	Break
1245 – 1345	**Drill String Maintenance**
1345 – 1400	**Course Conclusion**
1400 – 1415	**POST-TEST**
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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