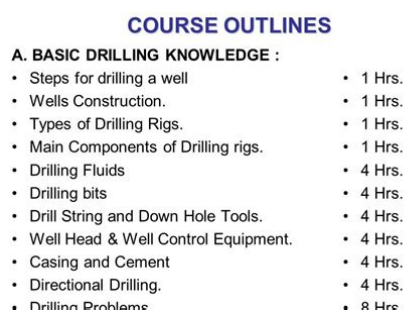
Drill String Design Manual



COURSE OUTLINES

A. BASIC DRILLING KNOWLEDGE :

• Steps for drilling a well	• 1 Hrs.
• Wells Construction.	• 1 Hrs.
• Types of Drilling Rigs.	• 1 Hrs.
• Main Components of Drilling rigs.	• 1 Hrs.
• Drilling Fluids	• 4 Hrs.
• Drilling bits	• 4 Hrs.
• Drill String and Down Hole Tools.	• 4 Hrs.
• Well Head & Well Control Equipment.	• 4 Hrs.
• Casing and Cement	• 4 Hrs.
• Directional Drilling.	• 4 Hrs.
• Drilling Problems	• 8 Hrs.

File Name: Drill String Design Manual.pdf
Size: 3472 KB
Type: PDF, ePub, eBook
Category: Book
Uploaded: 15 May 2019, 16:49 PM
Rating: 4.6/5 from 820 votes.

Status: AVAILABLE

Last checked: 11 Minutes ago!

In order to read or download Drill String Design Manual ebook, you need to create a FREE account.

Download Now!

eBook includes PDF, ePub and Kindle version

Book Descriptions:

We have made it easy for you to find a PDF Ebooks without any digging. And by having access to our ebooks online or by storing it on your computer, you have convenient answers with Drill String Design Manual . To get started finding Drill String Design Manual , you are right to find our website which has a comprehensive collection of manuals listed.
Our library is the biggest of these that have literally hundreds of thousands of different products represented.

Book Descriptions:

Drill String Design Manual

To browse Academia.edu and the wider internet faster and more securely, please take a few seconds to upgrade your browser. Drill String Design BHA Design Rass Amri Download with Google Download with Facebook or create a free account to download. Drill String Design BHA Design Download. Drill String Design BHA Design Rass Amri Loading Preview Sorry, preview is currently unavailable. You can download the paper by clicking the button above. These components allow us to deliver the rotation, the weight and the fluids from surface to the bottom of the drilled hole. We can say that the drill string is an important part of the rotary drilling process in oil and gas wells.To understand more about the drill string we will have to go through two subjects Drill string components serves several purposes and functions which includes the following The Bottom Hole Assembly may also contain other components such as a downhole mud motor and rotary steerable system RSS, measurement while drilling MWD, and logging while drilling LWD tools. The components are joined together using rugged threaded connections.In the past, the two main components of the Drill String consisted of the Drill Pipe and the Drill Collars. The point where the relatively small OD and flexible Drill Pipe connects to the large stiff Drill Collars is called the Transition Zone. Oilfield studies have shown that almost all of the Drill Pipe fatigue failures are the result of an accumulation of fatigue damage occurring when the Drill Pipe joints were run in the Transition Zone, or were stressed above the endurance limit in crooked holes. Down hole data has indicated that the large change in diameter at the transition zone caused accelerated fatigue damage as a result of the concentration of cyclic bending stress reversals in the bottom joints of the flexible Drill Pipe, since the stiff Drill Collars bend very little from these stress reversals.http://dongsuhk.com/userfiles/cpu-u0026-compiler-specifics-manual-of-emboss.xml

- **drill string design manual, drill string design manual pdf, drill string design manual download, drill string design manual free, drill string design manual online.**

Each joint of drill pipe consists of the tube body and the Tool Joint connection. Drill pipe joints are available in three length ranges The drill string components should also withstand burst and collapse pressure loads and be designed to minimize hole stability problems. There are many factors that must be considered in the design of the drill string such as This is not a commercial site in other words we are not buying or selling any tools or services and we are not supporting any product.Created by Idntheme. Selection of BHA connections3. Determination of drill collar and or HWDP length4. Tool joint torsional capacity check5. Tension design limitations6. Burst pressure determination7. Collapse pressure determination8. Slip crushing load9. The grade of drill pipe describes the minimum yieldstrength of the pipe. Flowloop setup components for drillstring washout and gas injection Eulerian Formulation of a Drillstring Constrained inside a. Design Manual Index. 4 RPP BELT PROFILE. Results analysis conducts to Grade S selection. The well requirements are exceeded by this configuration. Slight enhancement brought by 24.7 ppf DP in the mechanical responses. Insignificant increase of the internal DP pressure loss does not constitute an issue. Significant Hydraulics improvement is brought with reduced surface standpipe pressures for determined flow rates. No issue raised. Benefits bought regarding both Mechanical and Hydraulics responses. For this purpose, a full 7” casing 6” ID string was designed. The use of a tapered string is no longer allowed due to the upper DP tool joint OD exceeding the 7” liner ID. In this configuration, 4” DP is mandatory based on mechanical and hydraulics benefits and also on severe hydraulics limitations of the 3 ” DP in this scenario.http://alicartours.com/imagenes_alicar/cpu-voltage-offset-vs-manual.xml

This connection is mechanically overrated for Phase 3 applications but the larger ID will slightly reduce pressure drop, surface pressure requirements, and offer hydraulics flexibility without needing to upgrade the mud pumps and rig surface equipment requirements to a 7500 psi system Most of these failures result from stress corrosion cracking when drilling stresses are excessive and corrosion is not controlled adequately. The corrosion is caused by the acid generated by the sour gas dissolved in the water phase of the mud system. This effect is more drastic for the Grade S DP than the Grade G DP due to the material properties. Because H2S is not miscible with an oil based mud and as the water phase concentration is low 2040% and noncontinuous, OBM provides a simple mitigation to this corrosion problem. Steel will not corrode when the metal is oilwet. A tapered BHA design should be used with a tapered transition section. A WBM treated to maintain its pH above 10.5 will help reduce stress corrosion fatigue cracking. Adherence to good, established drilling practices also helps minimize the problem. Besides treating the drilling fluid, all possible steps should be taken to keep oxygen out of the drilling fluid system. Prior to implementing these recommendations regarding the mud system LTOBM or pHcontrolled WBM, consult with Aksai concerning potential for DP corrosion and results of corrosion monitoring for DP currently in use. The methodology used was to establish a base case and then carry out sensitivity analyses. The fitforpurpose WellPlan software was used, but it has been found to have some limitations and an update of the database is required to be able to extend the analysis to all currently available drill string specifications. Indeed, for accurate predictions, it is necessary to backcalculate the different parameters friction factor, mud rheology, etc from Phase 2M wells data.

Furthermore, the drilling and tripping parameters as WOB, overpull, exceed significantly the ones applied in Phase 2M drilling campaign in well 9806, WOB at 1015 klbs for 12 ” and 8 ’ sections, max 3050 klbs overpull while backreaming. The annulus pressure loss is negligible compared to that for the Drill String, so no significant surface DP pressure increase is to be expected. This concern was raised in paragraph 5.1 below. In the heavy rig ITT, a 7500 psi circulating system was specified. From the manufacturers’ data, both 12P160 and 14P220 triplex mud pumps are rated to 7500 psi max working pressure using 4 ” liners. This configuration will not meet the minimum required flowrate in the 12 ” section, even with three pumps online. With 2 mud pumps operating and one as backup, the minimum liner size required is 6” and the mud pumps output pressure is limited to 4670 psi for the 12P160 and to 6285 psi for the 14P220. Landmark software support was requested and they advised that the “Include Cutting Loading” option should not be used in the analyses. The “Sine Wave” method, which was applied for the simulation, modifies the inclination and azimuth of the wellpath point based on the concept of a sine wave shaped ripple running along the wellbore. The parameters are presented below It should be noted that the main purpose of the study is not to predict the “real” drilling parameters and their related “real” drilling conditions, but to perform a comparative study to determine the optimum the Drill String design using conservative input parameters. The maximum allowable surface pressure is then 4500 psi not used in any calculation and can be included on certain plots as a reference. Pump Rate graph. Indeed, the following major concerns can be spotlighted The values are calculated from limited parameters, and are not considered as definitive. The estimated pressure with a packed hole BHA without MWD and PDM is 5500 psi.

As sensitivity analysis, calculations and a detailed engineering study were done for this configuration see case 6 later to evaluate the benefits of such DP compared to the basic 5 ” ones. Pump Rates graph presented above must be used with extreme caution. Indeed, the calculations include the hypothesis of a DP internal pressure loss generated by the tool joints. This type of pressure loss occurs as a result of constrictions inside the DP tool joints as indicated in the geometric characteristics table. Thus, the magnitude of this type of loss is affected primarily by the

internal geometry of the tool joint. Pressure losses due to tool joint upset in the annulus are accounted for in the calculations by considering the crosssectional area change in the annulus. Tool joint pressure losses are sometimes referred to as minor pressure losses. Indeed, the drilling conditions could be considered as harsh due to The possible explanation is the reduction of the drill string stiffness. Any other drill string design might bring some technical improvements, but should be clarified by a costbenefits analysis. Once derated to Class 2, the tension limit is exceeded by about 30,000 lbs in backreaming mode. The Class S DP grade is highly recommended and all further calculations will be run assuming this configuration. The tension and torque limits are far in excess of what the Phase 3 wells campaign will require. This dedicated and upgraded equipment will generate additional costs This assumption must be confirmed by additional evaluation based on fluids design engineering. To really compare their benefits, we will need to obtain a more detailed rheological specification for both fluids from the Fluids Services Company. No abnormal extra drag could be noticed. As the Wellplan database is not up to date, the calculations could not be run with this XT39 Tool Joint. Landmark software support personnel were consulted and advised that the "Include Cutting Loading" option must be removed.

Few Drill collars were incorporated in the drill string to simulate the stiffness of the 4 " LWD tools. The drilling BHA weight is also very light with only 3 " HWDP. The maximum tension is recorded at surface, location where the 5 " DP is fitforpurposes. The main risk is to be excessively overbalanced with respect to reservoir pressure leading to losses, formation damage, differential sticking or well bore destabilization. The torque generated in both open hole and 7" liner would not exceed the 3 " DP torque limit while drilling. Caution is required while attempting to free the drill string by applying torque at surface No operational issue was raised, except in case of severe reaming with an obstruction not located at bit but on the BHA. As in the simulations, the internal DP pressure loss due to tooljoint is considered as negligible; the smaller ID of this connection would not have any impact in the hydraulics calculations. The benefit of the NC40 connection is the provision of a larger torque limit. The 4" DP is specified with NC40 connections The benefits brought by the 4" DP are not entirely justified regarding the drilling constraints and parameters. In this case, the 4" DP benefits raised above are strongly reinforced and even, become mandatory. The 4" x 5 " string complete pressure loss is reduced by about 59% compared to the 3 " x 5 " configuration. This hole cleaning in subhorizontal drain is one of the most important concern. The cuttings settling on the low side generates a solids bed, which once settled is difficult to remobilize and could lead to hole packoff and BHA stuck. Despite the increase of the torque at surface compared to the 3 " DP configuration, the torque safety limit is higher for the 4" DP Grant Prideco provide the XT39 connection, offering The source of fatigue failure is micro fractures between the crystal structures of the material caused in the construction of the material.

The Fatigue Endurance Limit is not a constant value that is related to the yield strength of the pipe. Bending stress concentrations are also in the tubular due to the design of tooljoints and the shape of the upset in the body pipe apart from those considered in the bending stress magnification factor. The number of cycles for the fatigue endurance limits is approximately taken at 10 7 rotations, this is the level of cyclic stress beyond which the material is immune to fatigue failure.Most of these failures result from stress corrosion cracking when drilling stresses are excessive and corrosion is not controlled adequately. Prior to implementing these recommendations regarding the mud system LTOBM or pHcontrolled WBM, consult with Aksai concerning potential for DP corrosion and results of corrosion monitoring for DP currently in use. A separate costbenefits analysis will be performed for each DP against expected ROP, risks analysis There is no need to upgrade it to the 7500 psi Stand pipe Manifold, HP flow lines, where the additional operating costs may not be offset by the drilling operations time saving. Larger 14P220 Triplex pumps advocated by Phase 2M, but a costbenefit analysis has not been provided to support this. The inherent risk is a premature wear of

the DP erosion due to solids content and high fluid velocity, fatigue due to internal working pressure associated with mechanical stresses generated by the well profile, which are drastically increased for tortuous wells or nearsurface sidetrack, which may lead to an unpredicted DP failure. The 7 slip body will allow the use of thicker dies All Varco top drive saver subs should be 5 ” from shoulder to shoulder. This ensures the top drive pipe handler torque wrench grips the box at least 2 from the box shoulder face, eliminating opportunities for squeezing the box in the counterbore region.

As such, for other top drive brands, the top drive saver sub should also be a length that provides torque wrenching at the same 2 length minimum from the box shoulder face Check with the B.O.P. manufacturer. Adjust the effective bore in the top drive bell stabbing guide to ensure there is no more than ” clearance on the diameter between it and the XT57 box tool joint OD. With a 7.000” O.D. tool joint, the standard 5” top drive bell stabbing guide will usually work good. Varco flipper part number is 99304 For the XT connection, this will ensure proper alignment when stabbing and reduce stabbing damage. If you continue browsing the site, you agree to the use of cookies on this website. See our User Agreement and Privacy Policy.If you continue browsing the site, you agree to the use of cookies on this website. See our Privacy Policy and User Agreement for details.If you wish to opt out, please close your SlideShare account. Learn more. You can change your ad preferences anytime. Why not share! Their customer service is outstanding, never left a query unanswered.I highly recommend them. The papers are delivered on time and customers are their first priority. This is their website www.WritePaper.info HelpWriting.net But use it only if u rly cant write anything down.On completion of this module you will be able to. Indentify different types of Drill String failure. Understand the factors that influence the life of Drill StringDescribe the prevention measures to prevent DS failure andPremature and unexpected failures of drill strings causeReducing drill string failures will improve rig operatingDesign Drill string design is selecting components and configuringInspection Drill string components, unless new, have been exposedOperation The Drilling operation presents many opportunities toSurroundings The chemical and mechanical environmentWhat is a Drill String FailureLocationMechanisms which can cause failures. Tension. TorsionSulfide Stress Cracking. Fatigue.

Other CausesActs only if stresses in a component exceeds someDS Failure MechanismsTorsion. Collapse Pressure. Burst Pressure. Combined Tension and Torsion. Combined Tension and CollapseCan occurs at low stress level. Split Box. DS Failure MechanismsSulfide Stress Cracking Corrosion failure. Stress Corrosion Cracking Corrosion failureFatigue. Torsion. FailureMechanismTension. Other. FailureMechanismA condition in which the bulk stress in a componentOverload and FatigueFatigue. Damage that accumulates when a component undergoesOccasionally the pin will fail if the connection was made upTensile FailuresAppearance Jagged and. Necked down. Orientation 45 deg to pipeBox do not fail in tensionUse a marking system that shows tube weight andResponding to Tensile FailuresMake sure that the rig weight indicator is calibratedTherefore in all cases, torsional failures will occur inTorsional FailuresTorsional stress limit is exceeded. Failures occur in form of stretched pin or belled box swelling. Torsional failures usually occur in the tool joint.Check tool joints to ensure that they meet with all the dimensionalMake sure torque application device is working and calibrated properly. Responding to Torsional FailuresUse API tool joint compound with a FF between 0.95 and 1.05 orMake up connections to recommended torque.Burst is more likely to happen when pipe is high in the hole. Collapse is most likely to happen deep in hole, evacuated for drill. String testing. Burst and Collapse FailuresIf during drilling significant wear is expected thenCollapse and burst pressures will be determined byDetermined byBurst strength. Tensile strengthReducing side force by minimizing DLS especially high up in theUsing drilling fluids containing solids weighted. Always using sharp tong diesAlways using sharp tong dies. Minimizing rotating hours use downhole motors. Run a “casing friendly” hardbanding material on tool jointsWeld Related Failures.

Welding alters the mechanical properties unless the component is reheatCan occur at low stress levels. Split boxSulfide Stress Cracking. Stress Corrosion CrackingSources of Cyclic Loads. Fatigue damaged is caused by repeatedUsually occurred when the string is rotatedFatigue may result from excessive vibrationThese points become the origin of fatigue cracks, which act as theirStress ConcentratorsUnder cycle loading, microscopic damage at high stress. The crack grows under continuing stress cycles until aThe crack will be oriented perpendicular to the axis of the pipe orFatigue cracks will originate at high stress concentrators namely. Recognizing Fatigue Failures. Fatigue cracks will originate at high stress concentrators namely,A fatigue crack surface will clearly show mode of attack. Ratchet marksShape and Appearance. Flat planar shape. Maybe accompanied by ragged area whereLocationOrientation. Perpendicular to the pipe axisSlip cuts. UpsetsCyclic loading causes veryWith repeated cycles, theFatigue cracks occur in a 90Prevention of Fatigue Failures. Ensure good rig site operation practices. Check BSR and SR, stress relief features. Chose the right connection type NC. Follow inspection program. Consider rotating the string more slowly, by means of introducing aHigher flow rate, especially if abrasive solids present. Corrosion occurs due to electrochemical reactions with corrosive agents. Corrosion rate increases when. Higher concentration of corrosive agents O2, H2S, CO2. Corrosion rate decreases when. Reducing dissolved O2. Reducing dissolved CO2. Add coatings and inhibitorsCorrosion reduces the wall thickness of tubular. There are three patterns of corrosion. Uniform wall thickness reduction. Localized patterns of metal lossLocalized patterns of metal loss.

PittingThe metal becomes brittle and will break suddenly and withoutOccurs in H2S environmentElemental hydrogen combines to form molecularCorrosive attention usually falls into one or more of the areas belowKeep H2S out of the mud system byControl the Metallurgy. Use a different grade pipeAvoid lost in hole. To assess threads for repair. Customer requirementsUltrasonic wall thickness. Magnetic Particle cracks in thread roots and stress relief features. Liquid Dye Penetrant thread roots and stress relief features. Electromagnetic DPElectromagnetic DP. VisualWhat is a good program There is no “Perfect” answer. DS1 is a guide but not a policy. Areas to consider when creating a programSafety and environmental impact of a failure. Cost impact of a failure. Risk tolerance of managementAPI RP 7G Drill String Design and Op Limits. API SPEC 7 Specifications for Rotary Drilling Elements. API SPEC 5D Specifications for Drill Pipe. SLB Drill String Design manualSLB Drill String Design manual. TH Hill DS1 Drill String DesignNow customize the name of a clipboard to store your clips. A fatigue which originates as a result of repeated or fluctuating stresses with maximum values less than the tensile strength of the material. Fatigue fractures are progressive, beginning as minute cracks that grow under the action of fluctuating stress. The rate of propagation is related to the applied loads and under certain conditions may be extremely rapid. The failure does not normally exhibit extensive plastic deformation and is therefore difficult to detect. There is no accepted means of inspecting which will determine the amount of cumulative fatigue damage or the remaining life in the pipe at a given stress level. Special attention to these critical failure areas should be performed during inspection to facilitate crack detection in drill strings which have been subjected to abnormally high bending stresses.

Drill pipe which has just been inspected and found to be crack free may develop cracks after very short additional service through the additional damage to previously cumulative fatigue damage. The development of fatigue is further accelerated through combined tension and torsion loading. If the washedout drill string is not tripped out at the right time, the drilling mud will induce intensive wall erosion eventually resulting in failure. When the drill pipe rotates in a curved section of the wellbore, the microcrack constantly opens and closes passing through the short and long radius curvature. When the microcrack opens, the vacuum in it draws the liquid from the fluid on the same principle as a pump. Halfway through the cycle the microcrack closes and the liquid is trapped inside under pressure inducing further damaging effects. The drilling mud starts rapidly washing out

the pipe body and within a few minutes may result in a drill string failure. Progressing microcrack growth in the drill pipe body causes either a brittle fracture or a plastic deformation. This is due to the fact that they fail to fully consider the pipe's operating conditions down hole. In order to estimate the drill string condition more reliably, we need a method which considers the complete spectrum of factors that influence the rate of fatigue damage growth in the pipe body. Since the maximum number of rotations depends on the bending stress applied at any point in time, cumulative fatigue damage is not expressed as an absolute value but given as a percentage of total drill pipe service life 100%. The IADC Drilling Manual recommends that the amount of cumulative fatigue wear in the drill string be defined in a simple equation The following is used as the calculation basis It then calculates the values of the stress imposed at any point in the drill string and cumulative fatigue wear. During well construction there were three drill pipe washouts Fig. 7.

Such coincidental occurrence is explained by the highest susceptibility of the upset area. It is here that the stresses applied to the drill string are concentrated, thus the rate of microcracking is higher Fig. 8. The upset area at the collar is additionally damaged by slips or other drill pipe handling equipment. Any scratch or notch on the pipe surface automatically becomes a stress concentration point and accelerates fatigue crack development in this area. This is due to great differences in the values of bending and tension stress applied to the drill string at any point within the well path depending on dogleg severity and BHA weight. However, since the drill string rotates within a vertical section, it is hardly impacted by any bending stress, and fatigue wear develops slowly. Given this rate of fatigue development, the drill string would be rejected due to mechanical tool joint or pipe body abrasion rather than fatigue wear. When passing through these particular intervals, the drill string develops the most fatigue damage. The longer the drill string rotates within the high bending stress intervals, the faster fatigue wear grows and the higher the risk of pipe body failure. This corresponds to a bending stress of 115 MPa. This corresponds to approximately 40 h of continuous rotor spinning at a speed of 120 RMP. An interval by interval calculation of cumulative fatigue wear is shown in Table 6. However, by knowing the use of the pipe set prior to well N construction, which is 32,534m drilled, it is possible to estimate approximately the cumulative fatigue wear for normal drilling. Thus, the cumulative fatigue wear for the pipe set prior to mitigation of the problem can be assumed to be Measures to prevent washouts and increase overall drill pipe life should be aimed at relieving stress applied to the string and its duration Produced with the aim of being the leading, independent, technology based journal for the Russian, Caspian, CIS and Eurasia regions.

Covering from exploration through to drilling, completion and production technologies the ROGTEC publication works hand in hand with the regional Operators like Lukoil, Rosneft, Salym Petroleum Development, Gazprom, Gazprom Neft and many other. ROGTEC The Engineers choice! Bringing together drilling and production teams from Russia's largest operators, drilling contractors and service companies along with the leading Russian and International equipment suppliers. The RDCR is a one day show designed to allow the drilling and production sector to meet, share ideas, knowledge and issues on the latest case studies on drilling, cementing, completions, workover, stimulation and production enhancement technologies and practices. Bringing together drilling and production teams from Kazakhstans largest operators, drilling contractors and service companies along with the leading Kazakh and International equipment suppliers. Organised by TMG Worldwide in direct partnership with JSC NC KazMunayGas and the SRI PDT, the KDR is a one day conference split into three technology halls covering drilling, cementing, completions, workover, stimulation and production enhancement. Well assume youre ok with this, but you can optout if you wish. By integrating a suite of solid mechanics and programs that simulate bittorock and milltometal interaction, you can quickly customize your material design in real time, eliminating costly trialanderror field tests so you can achieve the desired results on the first run. Click below to get started. We need a little more information from you before we can grant you access. Meeting

Electricity Congress Symposium Symposium The maximum drillcollar diameters shown in the Lubinski tables in the IADC Drilling Manual, Sec. P1, 1 for straighthole drilling are essential for drilling a straight, useful hole and preventing drillstring failures. Rate of penetration ROP can be greatly improved by controlling dogleg severity.

Conventional drillstrings, especially for slim holes, are torsionally weak, limber, and lightweight and have a smallrestrictive bore. The lack of a stiff, heavy bottomhole assembly BHA for deviation control and sufficient bore size for adequate hydraulics reduces ROP and increases the probability of hole problems and drillstring failures. The lowstresslevel pinup drillstrings have proved to be strong, heavy, and stiff enough to drill straight holes without accumulating fatigue.LargeOD drill collars provide the maximum weight and stiffness to control hole deviation with a packed BHA and the maximum restoring force and drift diameter with a pendulum. If doglegs develop that exceed the limits, the logleg area should be renamed to reduce the severity of the holeangle change.Fatigue accumulates only when the drillstring components are weak and the stress exceeds the endurance limit of the steel. The daily cost of the well might be slightly higher for the correctly packed BHA and the correct lowstresslevel drillstring. Most downhole drillstring problems are predictable and preventable.The initial content has been derived from Robert E. Sheriffs Encyclopedic Dictionary of Applied Geophysics, fourth edition. Superior quality and excellent service are two watchwords that especially characterize the production branch for oil and gasfield tubular products and accessories of TPSTechnitube Rohrenwerke. This is proved by the fact that TPS OCTGProducts are applied worldwide in oil and gas exploration and production and that the TPSReference List for OCTGProducts includes many of the major oil and gas companies around the world. In this catalogue, we have the pleasure of presenting you detailed information and complete and comprehensive data regarding our production range of drill pipes for application in the oil and gas exploration and production industry. It is not intended as a substitute for the competent professional assistance which is a requisite to any specific application.