



**DanaEnergy**

**DRILL BITS &  
DOWNHOLE TOOLS**

Exploring Potentials,  
Propelling the Future.

Dedicated to **Excellence**,  
**Faithful** to Customers.



# WHO WE ARE

## Established ...

in 2008, Dana Energy's Drill Bits & Downhole Tools business proved its capabilities to become an influential player in upstream oil and gas projects. We truly sense the vulnerabilities and try to support our customers with the optimal equipment and service regardless of project conditions

## ... to provide

diversified range of products and services from reliable international sources for Iranian oil and gas fields. We cover a great portion of the local market for drilling bits; and are dedicated to support the market with cutting edge technology

## ... for

offshore and onshore projects of the upstream oil and gas section of Iran's petroleum industry. We have built trust for all the clients that we have worked with, based on performance, commitment, and mutual respect. Some of our clients are as follows:



# PRODUCTS & SERVICES

## Oilfield Services (Product & Service)

- Tubular running
- Completion Tools & Services
- Wellhead/BOP Services
- ESP Services

## Drilling Machinery (Products)

- Drilling Rigs (Onshore)
- Fracturing Equipment
- Cementing Equipment
- Coiled Tubing Units

## Stabilizers & Reamers (Product & Service)

- V-Stabilizer
- PDC Reamers
- Roller Reamers
- Near Bit Ejector Unit

## Directional Drilling (Service)

- Directional Drilling Management
- Downhole Motors
- Reservoir Navigation
- MWD/EM-MWD & Full-set LWD/RSS

## Oilfield Bits (Product & Service)

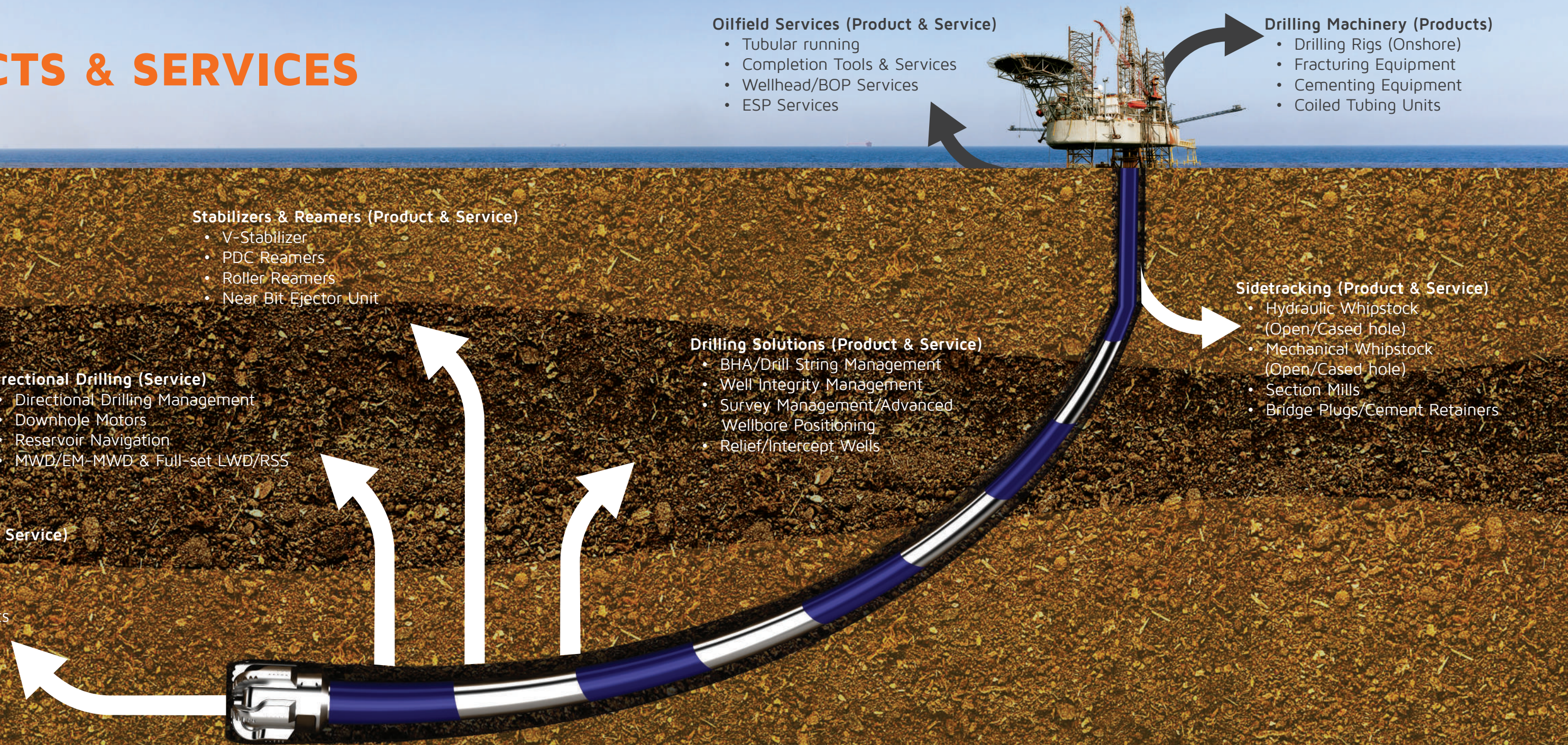
- Bit Design
- Fixed-cutter Bits
- Roller-cone Bits
- Core Bits/Special Bits

## Drilling Solutions (Product & Service)

- BHA/Drill String Management
- Well Integrity Management
- Survey Management/Advanced Wellbore Positioning
- Relief/Intercept Wells

## Sidetracking (Product & Service)

- Hydraulic Whipstock (Open/Cased hole)
- Mechanical Whipstock (Open/Cased hole)
- Section Mills
- Bridge Plugs/Cement Retainers



# DRILLING BITS

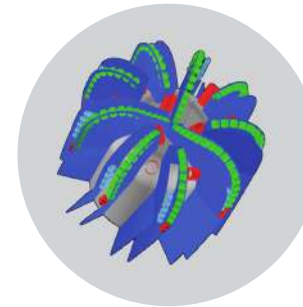
Dana Energy's Drill Bits & Downhole Tools provides industry-leading, high-efficiency fixed cutter and roller cone drill bit solutions for reliable performance in a wide range of drilling environments.

## PDC BIT DESIGN

We provide PDC Bit Design using BitScan software by modeling PDC bit behavior and predict drilling performance.

PDC Bit Design Enhancement service includes:

- DrillScan proprietary software BitScan©
- Powerful BHA Post-Analysis solution with advanced data processing, analysis tools and graphical capabilities
- DrillScan's extensive in-house knowledge and knowhow



PRE-WELL	REAL TIME	POST-WELL
✓	✗	✗



**Drilling challenge**  
A fit for purpose designed PDC bit aimed at meeting the drilling challenge.



**Drill faster**  
Drill faster with increased footage.



**Avoid dysfunctions**  
Avoid dysfunctions related to instability, fast wear out, directional response.



**Performance evaluation**  
Full drill bit characterization and performance evaluation.



**Offset wells**  
Complete analysis of offset wells.

## FIXED-CUTTER BITS

We provide a complete range of matrix and steel-bodied PDC bits and utilize premium cutter technology to deliver best-in-class performance.

### Range of production:

Steel Body: **3 ¾" – 26"**

Matrix Body: **3 ¾" – 17 ½"**

### Current market share:

**90%** of Iran offshore market

**50%** of Iran onshore market

**Bits supplied:** 1000+ pcs

### Services:

- Drilling bit design according to client requirement
- Manufacturing with the ability of meanwhile inspection
- Bit running and drilling supervising
- Bit performance analysis and bit design optimization



Supplied By: BESTE BITS

## ROLLER-CONE BITS

Standard products include steel tooth and insert roller cone drill bits plus bit series which mark a significant advancement in roller cone technology to improve durability and enhanced ROP.

### Range of production:

Mill tooth and Insert Bit: 3 ¾" – 26"

### Current market share:

80% of Iran offshore market

40% of Iran onshore market

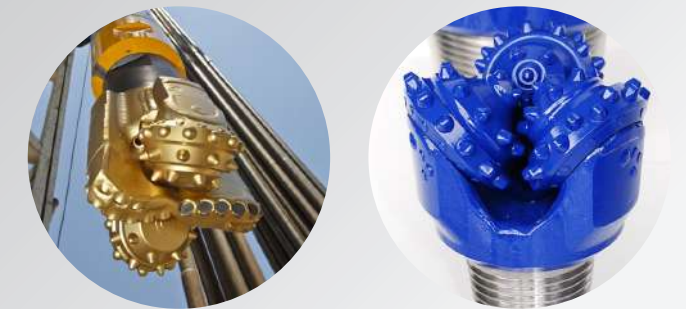
**Bits supplied:** At least 1200pcs

### Services:

- Drilling bit design according to client requirement
- Manufacturing with the ability of meanwhile inspection
- Bit running and drilling supervising
- Bit performance analysis and bit design optimization

## CORE BITS/SPECIAL BITS

Specially design premium bits such as Hybrid bits, Bi-Center bits and core bits manufactured to the tightest tolerances in the industry. Available in both matrix and steel body, and a variety of cutting structures from natural diamond, TSP and PDC. Bit performance analysis and bit design optimization



Supplied By: KINGDREAM

# SIDETRACKING

LOCALLY MANUFACTURED WHIPSTOCK SYSTEM,  
A DURABLE HIGH QUALITY SIDETRACKING SERVICE

Dana Energy's Drill Bits & Downhole Tools offers reliable and high-quality sidetracking services in Open/Cased hole situations to deliver the means in a low-cost/high-speed and yet, best-performance condition. We have perfected the matching of specific technology and design to the exact requirements of our clients. As a result, we are one of the leading local manufacturers of Whipstock and its services in Iran, where design, engineering, running and installation services are provided by our team of experts for both Onshore and Offshore projects.

## Cased-hole Whipstock:

- Hydraulic (Permanent or Retrievable): The Dana Hydraulic Whipstock is run and set in a single trip. This system provides isolation from the lower wellbore using an integral packer. It can hold 5,000 psi in both directions.
- Mechanical (Permanent or Retrievable): The Dana Mechanical Whipstock requires a plug in the wellbore to initiate setting. Patented double slip design ensures full, centralized slip contact, providing superior anti-rotation and bi-directional loading capabilities.

## Open-hole Whipstock:

- Expandable Anchor (Registered as a Patent 2011 in the United State Patent & Trade Mark Office): The Dana Expandable Anchor is run, oriented, and



hydraulically set in a single trip. It can be released by a straight pull. The anchor has two step (Each step three slips) located in the same housing and placed at 120 degrees spacing, providing maximum centralization and stability.

- Hydraulic Inflatable: The Dana Inflatable Anchor is run, oriented, and hydraulically set in a single trip. Patented element design enables the anchor to set in open holes and provides adequate torque resistance needed for milling or drilling.

We provide Low-Side application Whipstock upon client request.

In addition, we have designed and produced four generations of Tri-Mill assembly in terms of tungsten carbide insert design and pattern of inserts placement on Tri-Mill, which assembled with our Whipstock work towards improving performance, ensuring high durability of mill and ease the window opening in the lowest possible milling time.

**Whipstock Basic Parameters and Performance Data Table:**

Whipstock Type/ Size	Tri- Mill (cm)	Connection Type	Running Tool (cm)	Whipface Assembly (cm)	Whipface Angle (deg)	Packer Assembly (cm)	Shear value (lbs)
Cased Hole Hydraulic 5"	150	3-½ Reg	100	195	3	150	25,000
Cased Hole Mechanical 5"	150	3-½ Reg	-	195	3	-	30,000
Cased Hole Hydraulic 7"	200	3-½ IF	125	300	3	165	35,000
Cased Hole Mechanical 7"	200	3-½ IF	-	300	3	-	40,000
Cased Hole Hydraulic 9 5/8"	265	4-½ IF	155	380	3	180	55,000
Cased Hole Mechanical 9 5/8"	265	4-½ IF	-	380	3	-	60,000
Cased Hole Hydraulic 13 3/8"	350	6-5/8 Reg	230	650	3	215	75,000
Cased Hole Mechanical 13 3/8"	350	6-5/8 Reg	-	650	3	-	80,000
Open Hole Mechanical 6"	200	3-½ IF	-	300	3	250	40,000
Open Hole Mechanical 8 ½"	265	4-½ IF	-	380	3	300	60,000
Open Hole Hydraulic 6"	200	3-½ IF	200	350	3	280	40,000
Open Hole Hydraulic 8 ½"	265	4-½ IF	250	450	3	240	50,000

**Record breaking Performance: 5 hours**  
**9 5/8" Hydraulic Whipstock milled 6.7m of casing, cement and Radhuma formation in Balal Oil Field for IOOC, 2017.**

**Dana Bridge Plug:**

The Dana Bridge Plug is a qualified millable bridge plug utilizing new packer technology. The plug has been designed to withstand pressure up to 10,000 psi at temperatures up to 200°C

The simple design and new packer element technology reduces deployment risk, and allows one size to fit a wide range of casing weights. Setting can be performed with Drillpipe, Wireline, Coiled Tubing, and Snubbing.



**Cement Retainers:**

The Dana Drillable Cement Retainer is the best tool available for single-interval squeeze, batch or block squeeze cementing.

The Dana Drillable Cement Retainer is constructed of components subject to stringent material specifications and quality control procedures. It provides optimum strength and drillability combination. The tool is a two way valve which is controlled from the surface: no springs to cock or stick. Just pick up to close; set down to open. Maximum clearance for fast running plus improved drillability and pressure ratings make it the right choice.







# DIRECTIONAL DRILLING

## DIRECTIONAL DRILLING MANAGEMENT

The four services regrouped in this section of our services offers:

1. Unique coupling of BHA and Bit design against geology to predict behavior of any directional drilling system under all borehole and operating conditions
2. No bias towards specific techniques or tools, the one and only target is to design cost efficient and fit for purpose solutions
3. Designed solutions: Optimise existing assemblies and challenge Directional Drilling Service provider proposals, to achieve operational targets in the most effective way
4. Extensive track record of finding solutions for previously “unexplainable” directional behavior, reducing the need of expensive field trial and error processes

## BHA AND BIT DIRECTIONAL PRE-ANALYSIS

Strong experience is required to optimise BHA design. This service benefits from DrillScan experience and shares it with directional drillers.

BHA and Bit Directional Pre-Analysis service provides a complete analysis of the 3D directional behaviour of any proposed BHA.

Taking into account the interactions between the formation, an advanced modelling of the bit and the BHA, it ensures an accurate prediction of the BHA response (Build/Drop rate and Turn rate) and deflection along the well trajectory contributing into directional pre-engineering enhancement and mitigation of BHA Sag error.

Sensitivity analyses realized on operating parameters (WOB, Overgauge, Friction Factor...) bring value to validate the planned objectives in any situation and environment.

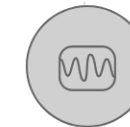
Taking advantage of our strong knowledge in directional drilling and experienced team, we also highlight potential directional inabilities and provide consistent recommendations on BHA and drill string design optimisation to improve your drilling performance.

PRE-WELL	REAL TIME	POST-WELL
✓	✓	✗



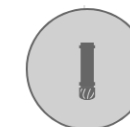
### Independent

Independent benchmarking of directional drilling solutions.



### Any type of BHA

We manage all BHA types on the market: Rotary, VGS, URWD, Motor and RSS, Casing While drilling, Coil Tubing Drilling and can help reduce the number of days required to drill a well.



### Save money

Achieve shoe-to-shoe drilling with a single BHA.



### Optimise

Reduce the cost per foot by choosing the correct BHA&Bit (RSS BHA are not needed every time!).

Supplied By: DRILLSCAN

## WELLBORE TRAJECTORY PREDICTION

The Wellbore Trajectory Prediction Service enables evaluation of any BHA design propensity to create detrimental borehole oscillations, such as hole spiraling.

Accounting for all information about geology (UCS log, Dip and Strike) and planned drilling parameters, we are able to anticipate potential inabilities to meet your directional objectives and expectable local tortuosity of a wellbore from a drill ahead mode with varying local conditions.

This analysis provides step-by-step projection of what can happen in the field and allows to assess the sensitivity of any type of BHA (Rotary, VGS, Motor, RSS, URWD...) to multiple operating parameters such as WOB, Hole Overgauge, Activation level, Toolface, Bit Walk and Steerability,...

By comparing the predicted behavior of the BHA to the planned objectives, we provide recommendations to optimize the Bit-BHA design and we help you to implement the most adapted mitigation measures to increase your drilling performance.

The Trajectory Prediction Service is a powerful Pre-Engineering tool that can also be exploited into a Post-Mortem process to determine unknown drilling parameters reasons for counter performance and improve the Bit-BHA design and behavior for next runs within a given environment.



### Drilling Performance

Implement the most cost efficient mitigation measures to increase your drilling performance.



### Hole spiraling

Reduce NPT and hidden lost time by avoiding effects of hole spiraling and increased friction



### Casing hole completion

Reduce borehole tortuosity to ease RIH operations hole for future casing or completion operations



### Landing strategy

Reduce uncertainty on drill-ahead and landing strategy (e.g. in complex geology)

PRE-WELL	REAL TIME	POST-WELL
✓	✓	✓

Supplied By: DRILLSCAN

## DIRECTIONAL PERFORMANCE ENHANCEMENT

Directional Performance Enhancement service is based on a pragmatic approach of BHA directional analysis. It gives the opportunity to study an offset well based on measured data and logs, in order to determine unknown parameters such as Hole Over-Gauge, Rock hardness, Friction Factors...

The findings are the base of further analysis on similar wells.

Then, using these results and understanding previous directional drilling performance, an exhaustive analysis of planned BHAs can be performed, improving directional model relevancy and enhancing result accuracy. These studies also include Drill Bit design check, Bit and BHA optimization proposal.

DrillScan Engineering team helps you to choose the drilling assembly fitting for your directional objectives.

This process, thanks to powerful and fast algorithm, can be conducted while-drilling to give the best answer to all directional difficulties faced.

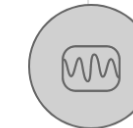
PRE-WELL	REAL TIME	POST-WELL
✓	✓	✓

Supplied By: DRILLSCAN



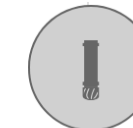
### Indépendant

Independent benchmarking of directional drilling solutions



### Any type of BHA

We manage all BHA types on the market: Rotary, VGS, URWD, Motor and RSS, Casing While drilling, Coil Tubing Drilling and can help reduce the number of days required to drill a well.



### Economise

Achieve shoe-to-shoe drilling with a single BHA



### Model improvement for following runs

Enhance the learning curve by modelling existing data, capitalising on results for the next well



### Increase efficiency

Increase drilling process efficiency by reducing intrusive over-steering

# DOWNHOLE MOTORS & MWD

## BHA AND BIT RUN DIRECTIONAL POST-ANALYSIS

Unexpected directional behavior is a key concern when drilling. To get prepared for these situations in future drilling phases, DrillScan offers the BHA and Bit Run Directional Post-Analysis service. It consists in using our strong in-house expertise in directional drilling.

This service enables:

- Understand counter-performance observed during the run of any detailed BHA (Rotary, VGS, RSS, Motor, RWD...).
- Using complete surface and downhole data sets while drilling (caliper, UCS, WOB, Activation or TFO log).
- Allows to compare actual performance results versus models prediction.
  - This comparison will provide sufficient information to understand and define what happened downhole through unknown or uncertain parameters such as friction factor, hole overgauge or bit directional behavior (bit steerability and walk angle).

BHA and Bit Run Directional Post-Analysis is an iterative process that results in a critical optimization for next BHA runs simulations accuracy. This unique process allows to improve significantly the learning curve and drilling performance in multiple wells development projects.

PRE-WELL	REAL TIME	POST-WELL
✘	✔	✔



**Model improvement for following runs**  
Enhance the learning curve by modelling existing data, capitalising on results for the next well.



**Increase efficiency**  
Increase drilling process efficiency by reducing intrusive over-steering



**Formation changes**  
Correlate hole overgauge to formation changes.



**Casing centralization**  
Gain an estimation of hole overgauge without a calliper log for casing centralisation and cementation.

Supplied By: DRILLSCAN



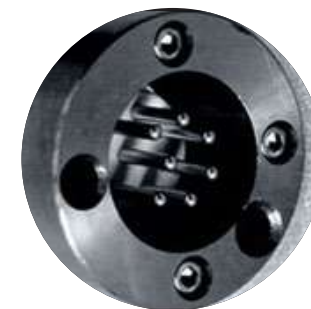
### MWD Pulse Telemetry

For deeper applications where high or low formation resistance is encountered during the drilling process



### Gyro Services

High accuracy, all-angle north-seeking multi-shot



### MWD EM Telemetry

For high LCM, under-balanced drilling, Air drilling higher data rates, reduced survey time



### Positive Displacement Motors

PDM power sections matched to your specific Application, D<sup>2</sup>ROX quality control ensures uptime and reliability, Drivelines built to deliver > 18,000 ft. lbs of torque, Rotor catch technology on all motors

Supplied By: KPK



# DRILLING SOLUTIONS

DRILLING SYSTEM AUTOMATION ROADMAP (DSAT)  
THE NEED FOR REAL-TIME MODELING.

## THE TECHNOLOGICAL GAP THAT DRILLSCAN COVERS




- Advanced & Field Proven Physical Models
- Unique 3D T&D Rigid Model Real-Time Compatible
- Unique 3D BHA | BIT | ROCK Interaction Model
- Patent on Drilling Performance Analysis

## AREA OF EFFECTIVENESS

Torque & Drag, 3D Buckling, Stress, Stuck Pipe Analysis  
Directional Drilling, GeoSteering, Automated Drilling System Control & Command  
Performance Analysis, Dysfunctionment Analysis, Vibration Analysis and Mitigation

## WELLSCAN SOFTWARE MODULES



### Directional Drilling

-  BHA Pre-analysis
-  BHA Post-analysis
-  BHA Trajectory

### Drilling Hydraulics

-  Wellbore Hydraulic



### Well Integrity

-  Casing Deformation & Standoff
-  Casing Wear


### Drill Bit Management

-  PDC Bit Model





### Drilling Mechanics

-  Torque & Drag & Buckling
-  Torque & Drag Soft-string

### Drilling Dynamics

-  Vibration Modal Analysis
-  Whirling

### Wellbore Survey

-  BHA Run Sag Correction
-  BHA Sag Pre-analysis
-  Local Dogleg
-  Well BHA Sag Correction

Supplied By: DRILLSCAN

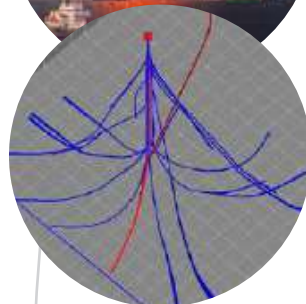
## RELIEF WELLS & INTERCEPT WELLS

### Specific Context

- Very small Target
- Avoid unexpected collisions
- Manage complex project
- Use of adequate Technology
- Do it right & do it fast!!

### Our Expert Solutions

- Workflow Process
- Survey Accuracy
- Anti-collision Management
- 3D Ranging Interpretation
- Directional Drilling Enhancement
- Interception & Milling Modeling



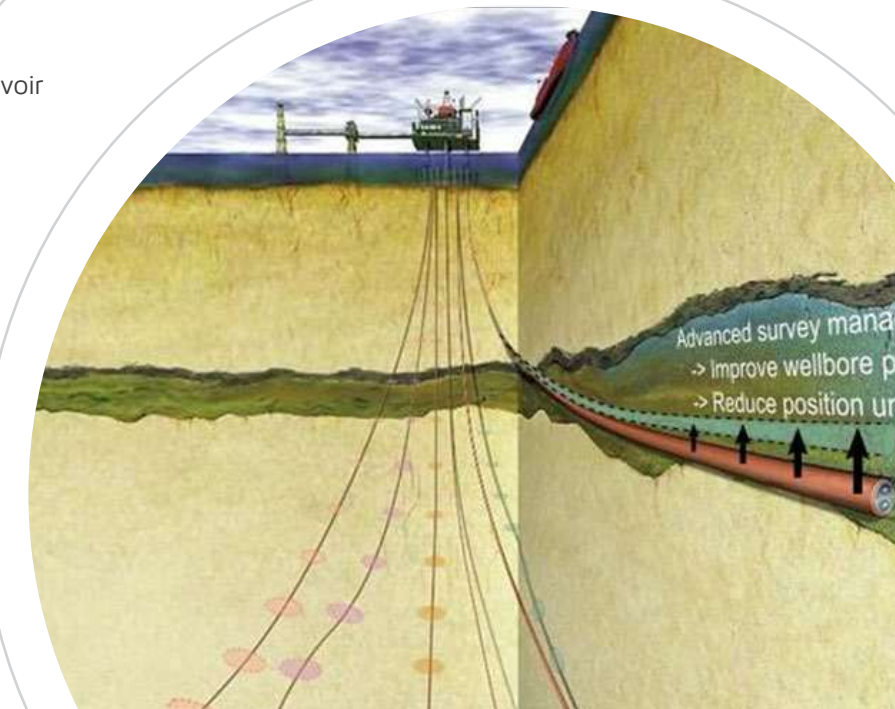
Supplied By: PATHCONTROL

## ADVANCED WELLBORE POSITIONING

PathControl "ACE" Methodology represents an innovative, independent and global approach to the wellbore positioning challenges throughout all well construction phases

### ACE" Methodology

- Optimize Engineering Work & Procurement
- Prevention & Risk Mitigation
- Drill Safe to target
- Maximize well value by improving placement in Reservoir
- Use of adequate Technology
- Do it right & do it fast!!



Supplied By: PATHCONTROL

# INTEGRATED SOLUTION

WITH THE MOST RELIABLE EQUIPMENT

The supplier to Dana Energy's Bits & Downhole Tools Company, as one of the flagship enterprises of petroleum Drilling & Production equipment, was established in 1941, featuring 75 years of related experience. We provide three major categories covering 16 series and over 200 models products, include drilling rigs, workover rigs, cementing units, fracturing units, high pressure manifolds, etc.

An acceptable range of drilling equipment covering BIG-EASY Drilling Rigs, Truck-Mounted Drilling Rigs, Modularized Drilling Rigs, as well as Automatic Pipe Handling Systems, Powered Catwalks, and rig movement devices.

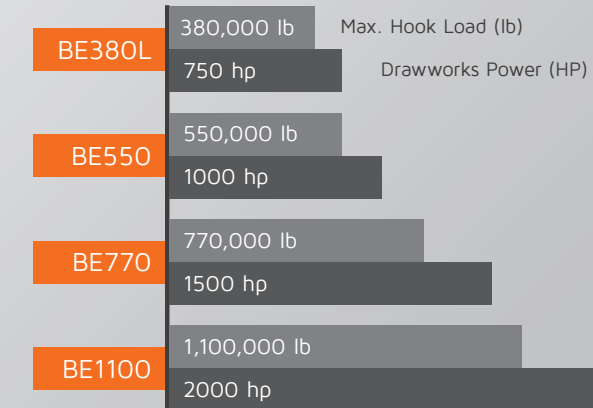
## AUTOMATIC PIPE HANDLING SYSTEM

Monkey-board Installation Height	25 m
Suitable Pipe Sizes	5" – 8"
Maximum Lifting Capacity	60 kN

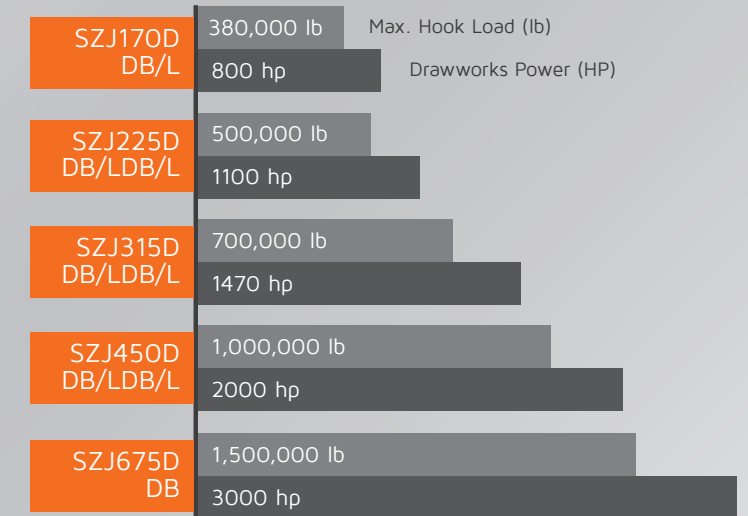
## POWERED CATWALKS

Model	SPC2000	SPC5000	SPC7000
Suitable Floor Height	≤5	7.5 – 9	9 – 12
Maximum Pipe Length	10	11.5	11.5
Maximum Pipe OD (mm)	473	508	508

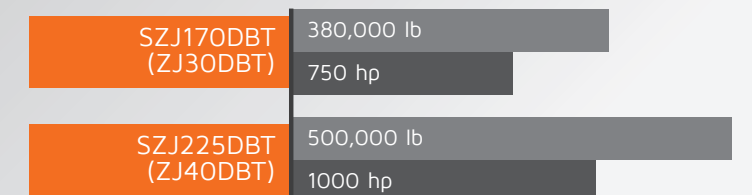
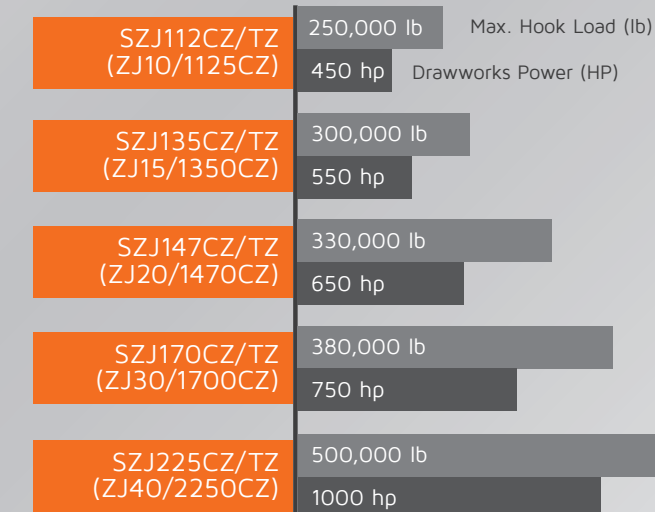
## BIG-EASY DRILLING RIGS



## MODULARIZED DRILLING RIGS



## TRUCK-MOUNTED DRILLING RIGS



## WELL SERVICE UNITS

### Workover Equipment

- Workover Rig: 150HP~1200HP, Max. depth 9000m
- Coiled Tubing Unit: Max. Pull Capacity: 100,000 lbs
- Snubbing Unit: Max. Lifting Load: 608,000 lbs

### Cementing Equipment

- Researched 300hp-600hp cementing pump, high-energy mixing and auto-mixing technology, having series of large-power cementing truck, batch mixing truck, low-temp cementing truck and desert cementing truck.
- Covering national 80% market share. Low-temp cementing package exported to CIS. "Auto-control double engine double pump cementing unit" is awarded as Sinopec science and technology (2nd prize).

### Fracturing Equipment

- National 863 project and national science and technology critical project. Formulated the industrial standard "Fracturing Package".
- First set of 2500 model truck-mounted fracturing packages in the world, up to international level. Awarded as provincial 1st prize in achievements for 3 times. The "acidizing mixing device" in blender truck is awarded as invention patent.
- Seizing national market thoroughly, the sales amount up to 0.48 billion USD in recent three years, and entering into the Tier One in the international research field.



## OFFSHORE PETROLEUM PRODUCTION EQUIPMENT

- 60-315t series offshore workover rigs.
- Double engine double pump auto-mixing cementing skid
- Offshore fracturing package: offshore fracturing skid, sand control skid, sand blender skid, instrument skid, etc.



Supplied By: SJ PETRO



### **Coming Soon:**

- Artificial Lift
- Full Set LWD
- RSS
- Completion Tool & Services
- Coring
- Fishing Rental Tools



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