



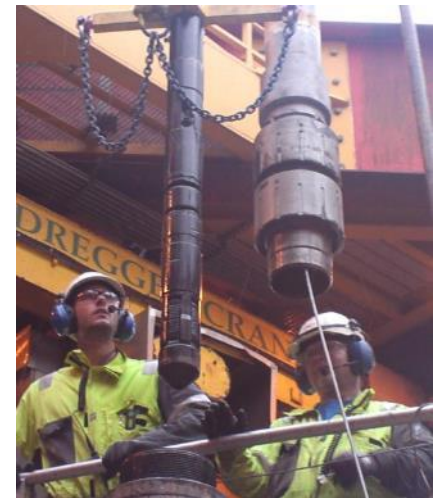
E Plug Technology Overview - OWI 2021 Perth

Electro-mechanical technology platform enables more flexible, efficient and stronger tools on e-line, reducing time, cost and risk.

An innovative technology development company

Company introduction

- E Plug is located In Norway near Stavanger, and was established to combine innovative thinking, with experience and know-how, **Adding New Ways** to the down hole industry.
- By **Adding New Ways** of using technology for down hole products E Plug makes well completion, intervention and P&A operations safer and more efficient
 - Providing next generation disruptive technology
- Game changing robust and cost-effective technology
 - So far saved more than 1600 operational hrs
 - Run in Europe, North Sea (NO/UK), US Lower 48, US Alaska, Kazakhstan, Angola, Middle East, SEA



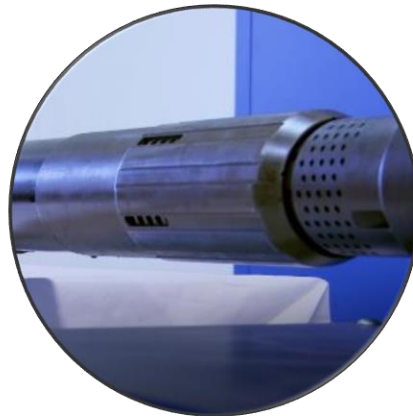
E Plug - The next generation in down hole solutions

Innovative method representing a new platform for operating down hole tools



TorcMethod

The TorcMethod enables E Plug to develop tools that can be operated electromechanically by controlling rotation and torque



Electric Manipulation Tool

The EMT uses the TorcMethod to transfer controlled rotation and torque to incredible axial loads



TorcPlug®

The TorcPlug is the worlds first barrier qualified multiple set retrievable bridge plug that can be run on wireline



Punch and Stand off

The punch and standoff tool enables a non explosive repeatable method to penetrate tubing. *Patent Pending

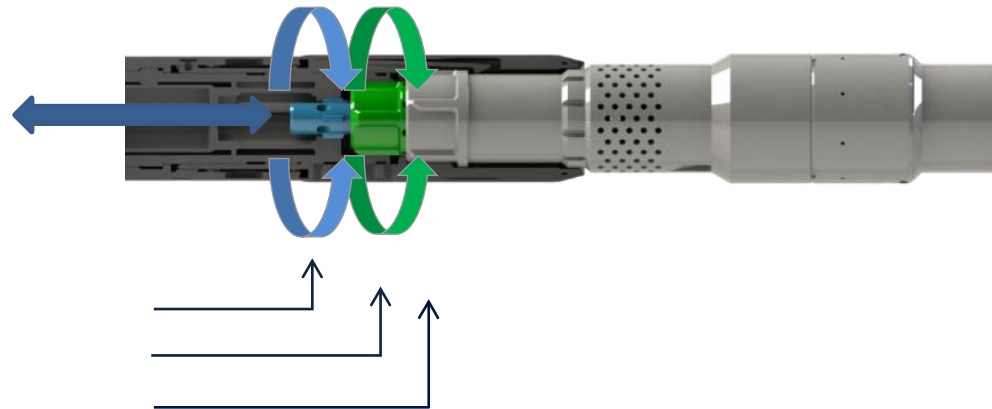
TorcMethod – The key to create an all-in-one tool

Transferring forces from one item to another

The TorcMethod is a new, patented and innovative technique for transferring forces from one item to another without the use of any explosives or pressurized chambers ensuring:

- Operation of the connected tool multiple times
- Operation of different features of the connected tool using separate manipulators
- Mechanical actuation and retraction
- De-tach and latch back on to tools

**Bidirectional 1st & 2nd
manipulator with hi/lo output
for multiple movements**



1st manipulator hi/lo output

2nd manipulator hi/lo output

Counter hold

Electric Manipulation Tool – EMT

The EMT is the all-in-one tool that can be applied to a range of products



Technical data:

- OD: 3.55" & 4.15"
- 150 °C/ 302 ° F
- Designed to 30 000 PSI operational pressure
- Applicable to all types of wireline and coiled tubing

- The EMT is an electric/mechanical tool that provides high torque to operate equipment based on the TorcMethod using controlled rotation and torque
- The EMT is equipped with two independent manipulators and selective latching mechanism which allows
 - Activating or deactivating features of the connected tool along with also operating a secondary feature independently
 - To latch on and off the attached tool whenever needed or use this feature to change between features within the connected tool
- Key features include:
 - Two-way communication
 - Extreme output axial force
 - Controllable forces from surface
 - Repeatable latch on and unlatch mechanism
 - Live data readings on surface;
(Rotations, Current, Voltage, Pressure, Temperature)



Surface control – Real time

User interface, live support from onshore – adapted to each product

Product visualization of components and active features are displayed in real time throughout operations

E PLUG
ADDING NEW WAYS
nytest

Connection 100% 10:44:50

Main view Details view Communication view Settings

Time	Message	Comment
10:42:44	Connection is established	
19.12.2017		
10:42:46	Connection is established	
19.12.2017		
10:42:52	Starting main sequence:	
19.12.2017	Set plug	

Operation

No. of turns: 9728
Target: 7500 - 16000
Max current: 684 mA Limit: 700 mA
Torque: 25 Nm Force: 0 kN

Main motor

Voltage: 401 V Speed: 1000 rpm
Current: 72 mA Temp: n/a °C

Chart

Display data: Current Speed
Time window: 2 min Fullscreen
Units: Metric

Pressure

Abs. press: n/a Bar Press. drop: n/a Bar / 2 min

Gear motor

Voltage: 400 V Speed: 0 rpm
Current: 0 mA Temp: n/a °C

FO RTL T V

Current gear: Torque

Valve status: CLOSED

Plug status: Setting plug

Main control Manual control

Gear select: Force open Ready to latch Torque Valve

Control: Go to position Unset plug Set plug Stop (esc)

TorcPlug Benefits

Improving Efficiency, Safety and reducing Risk

Reduce runs with unique TorcPlug and EMT features

- Improve safety with less rig ups
- Set, retrieve and repeat in same run,

Reduce or eliminate risks

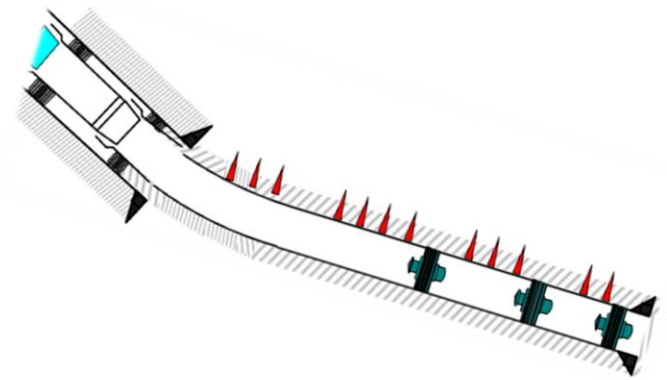
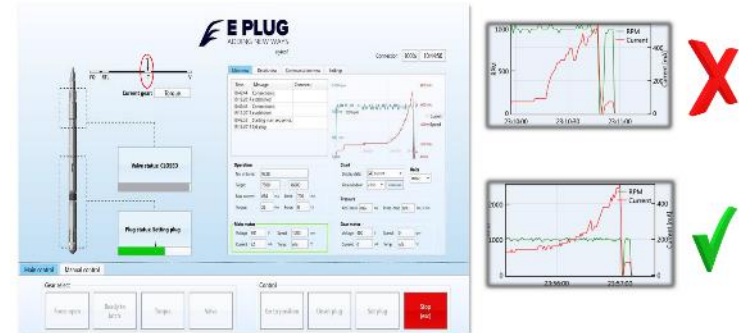
- Real time data to verify barrier prior to pulling out of hole
- Re-position if it cannot seal in challenging environment
- Eliminate risks of potential fishing operation caused by leaking conventional plug



MILLABLE
MULTI-SET
RETRIEVE IN SAME RUN

E Plug Technology – Multiset TorcPlug related applications

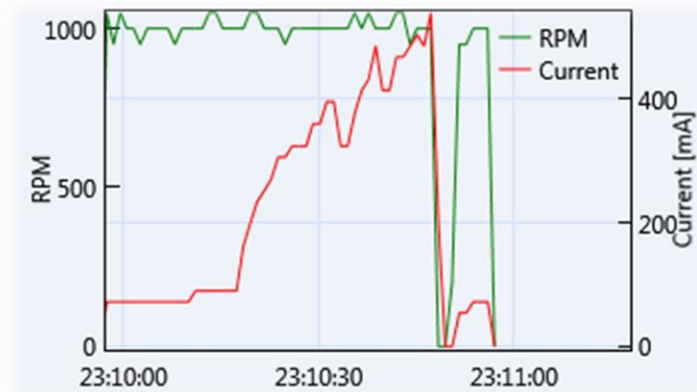
- Leak detection in multiple locations along the wellbore
- Reservoir water shutoff (can be adjusted multiple times in the same run by testing the effectiveness)
- Packer setting device
- Reposition in multiple zones for acid stimulation and fracking application
- ISO V0 Barrier plug with or without monitoring
- Well testing with surveillance above and below element
- Reservoir buildup test
- SIP (Selective Inflow Performance)
- Combine TorcPlug with live perforation guns and logging tools
- Harsh environments (scale, corrosion, erosion)



The value of real time information

Horizontal integrity test with multi-set TorcPlug[®]

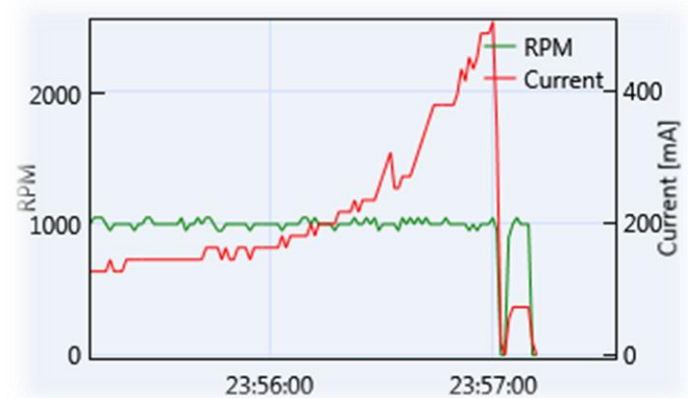
Data on surface provides decision making preventing unnecessary risks.



Clear indication on debris while setting the plug.



Bad



Clean setting area and expected current



Good

The reason for the outstanding TorcPlug track record

The setting sequence and the ability to control it

Electric Manipulation Tool (EMT)	Using rotation to create a strong controlled axial movement
TorcMethod	The counter hold opens up extreme torque output trough 2 rotations
Telemetry	Giving real-time data from operation with dual feedback to surface
Motor	Strong motor from little power made for the purpose of high inlet Torque to gearbox
Gearbox	Higher power efficiency on the direct drive
Interface	Adaptable with any crossover to create dual axial moment with rotation
Valve	Axial moment valve with Controlled equalization of pressure

Setting sequence;

1. Centralizer	With initial zero point to control movement of mechanical parts
2. Slips	First set to prepare the perfect setting of the packer
3. AXD	Are set to align the TorcPlug in the center of tubing
4. Packer	Preset before packer to minimize packer extrusion gap
	Operating the multiset design packer handling challenging tubing walls

The level of controlled forces - working in a designed setting process - with the features of the AXD & Packer - has given the results



Slips

Packer & AXD

Centralizer

Valve

Interface

Gearbox

Motors

Telemetry

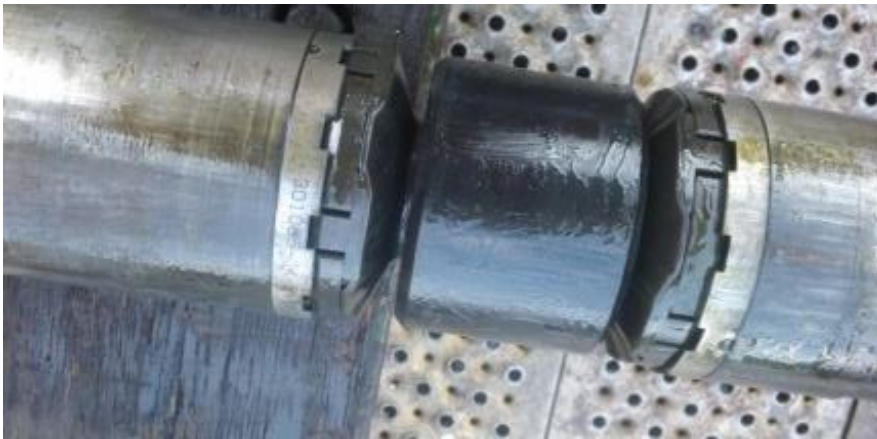
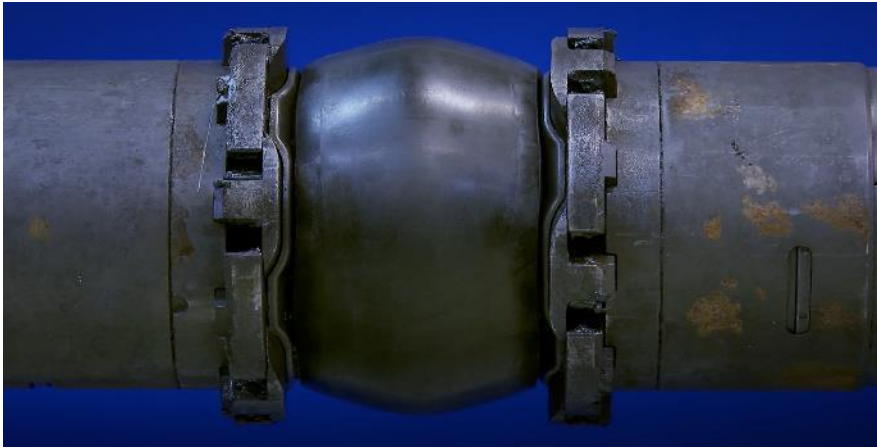
“Full control of the forces. Realtime surface read out. Plug setting sequence.”

Source: Company

Anti Extrusion Device protecting elastomer

Comparison with static back up

Full compartmentalization conforming to geometry prevents extrusion and elastomer damage.



TorcPlug Retrieving alternatives

4 Different alternatives to release and retrieve

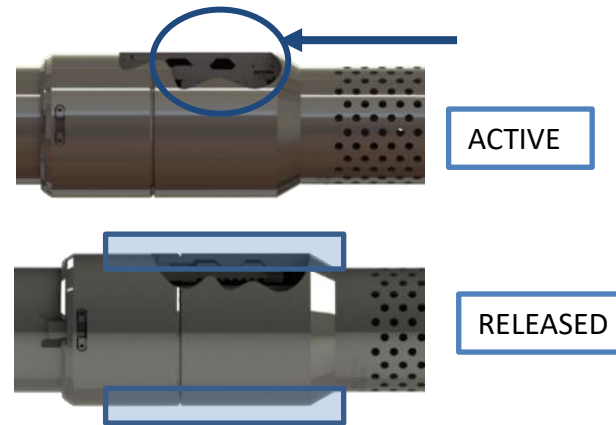
1. With Electric Manipulation Tool (EMT)
2. Mechanical Pulling Tool (MPT) on stroker, slickline, coiled tubing or drill pipe
3. Overshot with spiral grapple (fishing tool)
4. Mill to release – straight pull to retrieve
– Performed Sept 2017 for Qatar client



2. Mechanical Pulling Tool (MPT)



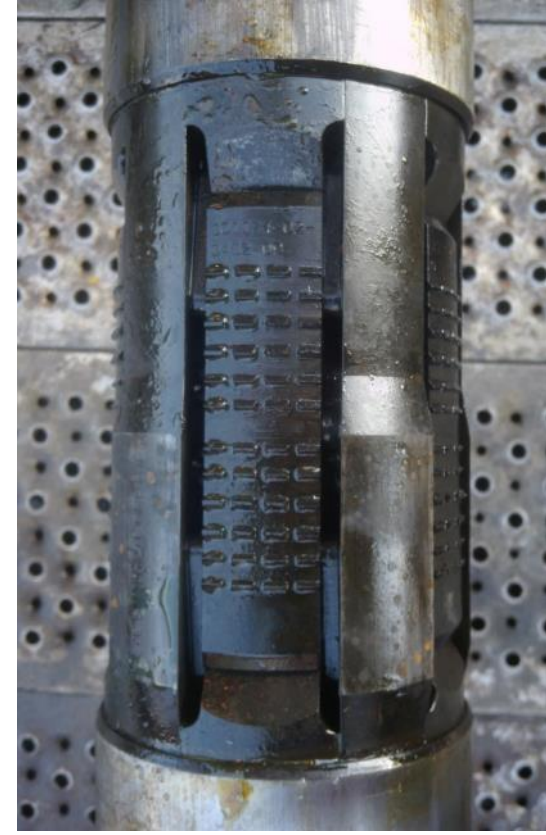
4. Milled 7" Plug with electric wireline



Short area on top plug to be milled

TorcPlug after 11 settings in one single run

In scale and corrosion environment



Reference jobs – Leak Detection

TorcPlug has been set up to 16 times in a single run.

Norway Operation	US Operation	KZ Operation	Angola Operation
Fixed Platform	Land	Island	TLP
11 Settings	16 Settings	4 Settings	8 Settings
Scale & Corrosion	Corrosion	Acidic	Corrosion
Oil and Condensate test medium	Water test medium	Nitrogen inflow test medium	Brine
Vertical crack	Multiple leak points casing collars	Shallow Micro leak 0.4bar / 24hrs	Casing collar

Over 100 settings performed to date for integrity and leak detection purposes

Non-explosive Combined Punch and Stand-off (CPS) Tool



Combined Stand-Off and Punch (CPS) Tool – main targets

1. Create multiple holes above packer for circulation and placement of cement

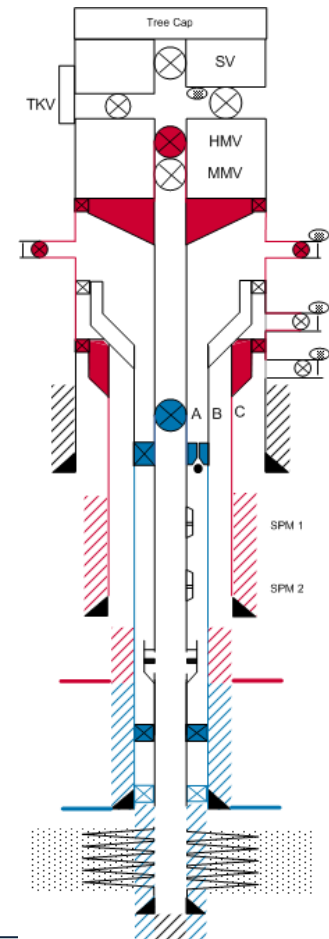
- a) Place x-sectional across tbg/a-annulus (*good cement in casing annulus*)
- b) No need for pulling upper completion during PnA**
- c) Known technology utilized a new way
- d) No damage to outside casing
- e) Combine with Dual logging (CBL) logging tools

2. Run offline on e-line

- a) No need for rig
- b) No need for coiled tubing
- c) No need for explosives
- d) Reduce cost during PPnA or slot recovery

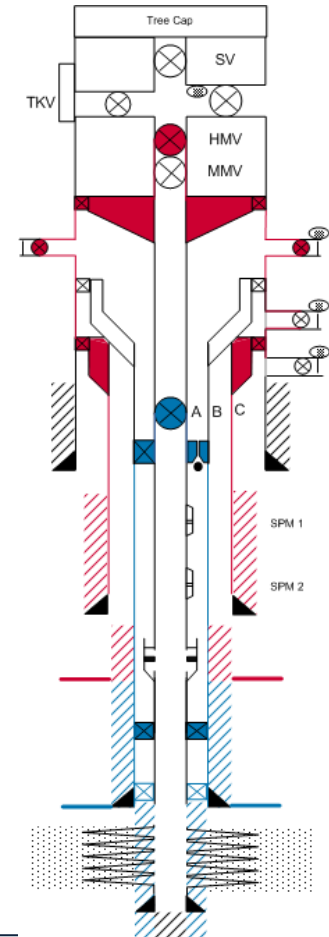
3. Centralization of tbg/csg on the low side inside another bigger tbg/cag (ex. 4 ½" tbg inside 7" liner)

- a) Optimized for circulation/washing and placement of cement



Combined Punch and Stand-Off (CPS) Tool – other applications

- Punch holes for circulations
 - Punch multiple holes in a single run to guarantee communication
- Run together with timer set bridge plugs
- Punch hole for tubing / annulus communication in order to install gas lift straddles
- Make multiple stand-offs to centralize a tbg/csg lying on the low side
- Collapsed tubing / Casing opener / Casing expansion
- Lock open DHSV sleeves (typical Baker DHSV)
 - Deform sleeve inside DHSV due to permanently lock it open



Combined Punch and Stand-off (CPS) tool

- Knives cutting through pipe
- Holes can be optimized upon request
- Removing at least 2% of the material
- Approved by *Hydrawell Intervention* for PWC applications



*4 x holes with 360 degrees coverage
for placement of cement and
centralization*

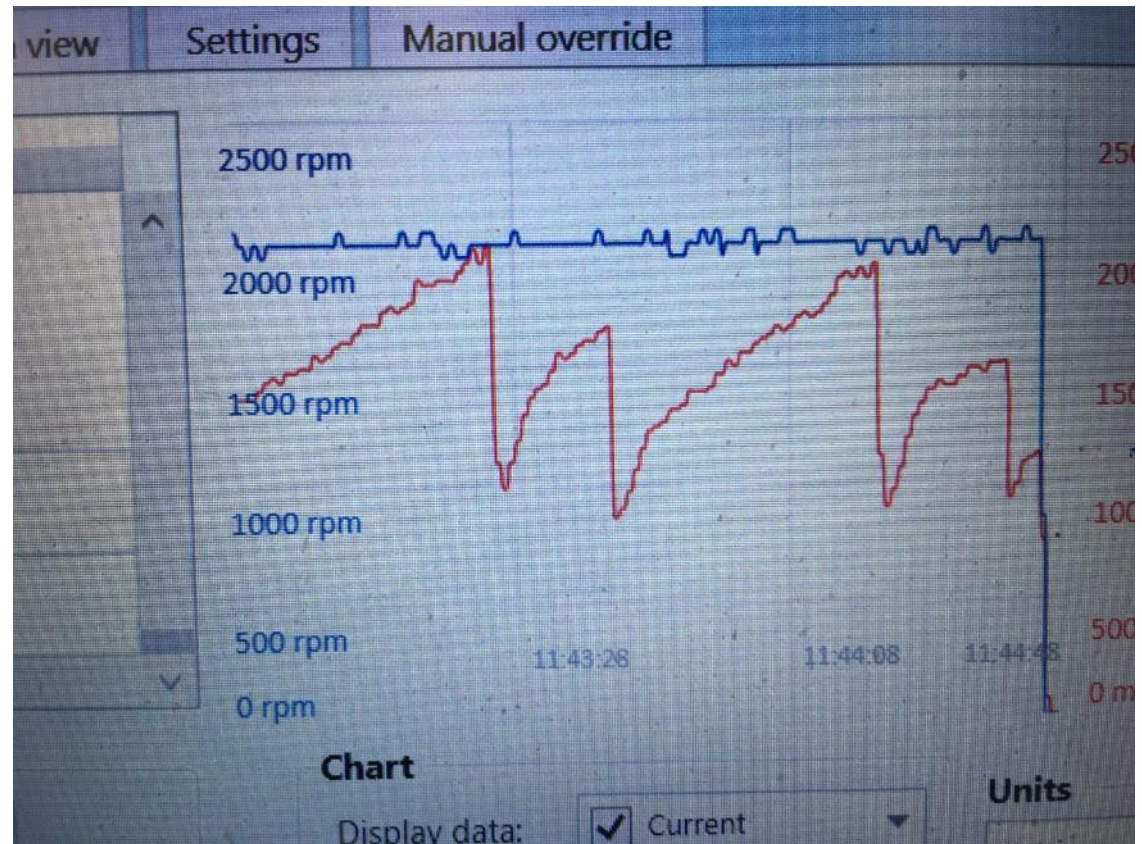
Create multiple holes on e-line

- In testing, CPS has done 1208 holes without changing knives.
- Removing at least 2% of material
- Creates hole and stand-off at the same time
- Hole size and shape upon request
- Run offline on e-line prior to PerfWash and cement operation



Surface readout and operational control

- 4 punched holes
- Clear signatures
- Surface readout
- Operational control



Tubing expansion profile

- 4,5" to $\text{Ø}131,7$ - 8,3mm radial standoff
- No holes



TorcDesperado



STool OD: 3.60"

355 EMT

Total settings so far: 320

No signs of excessive wear and tear

Stroke force: 70 Tons

Optimized for low frictions and CPS repeatability

TorcDesperado – Controlled radial forces applications

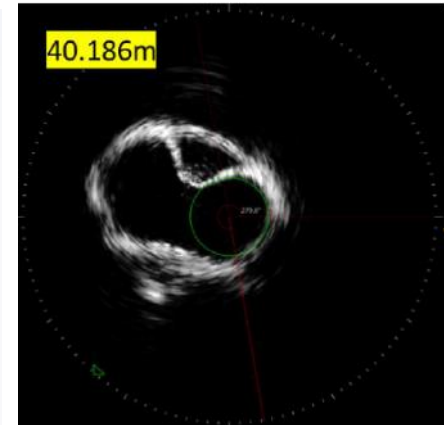
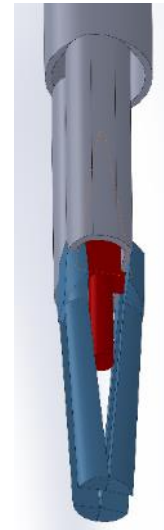
The unique feature built in to all the TorcFamily tools are:

- Topside interface to control and understand the operation
- High available forces adjustable at surface (*200K lbs on e-line*)
- Precession operation capabilities from surface
- Compact design



Typical well applications

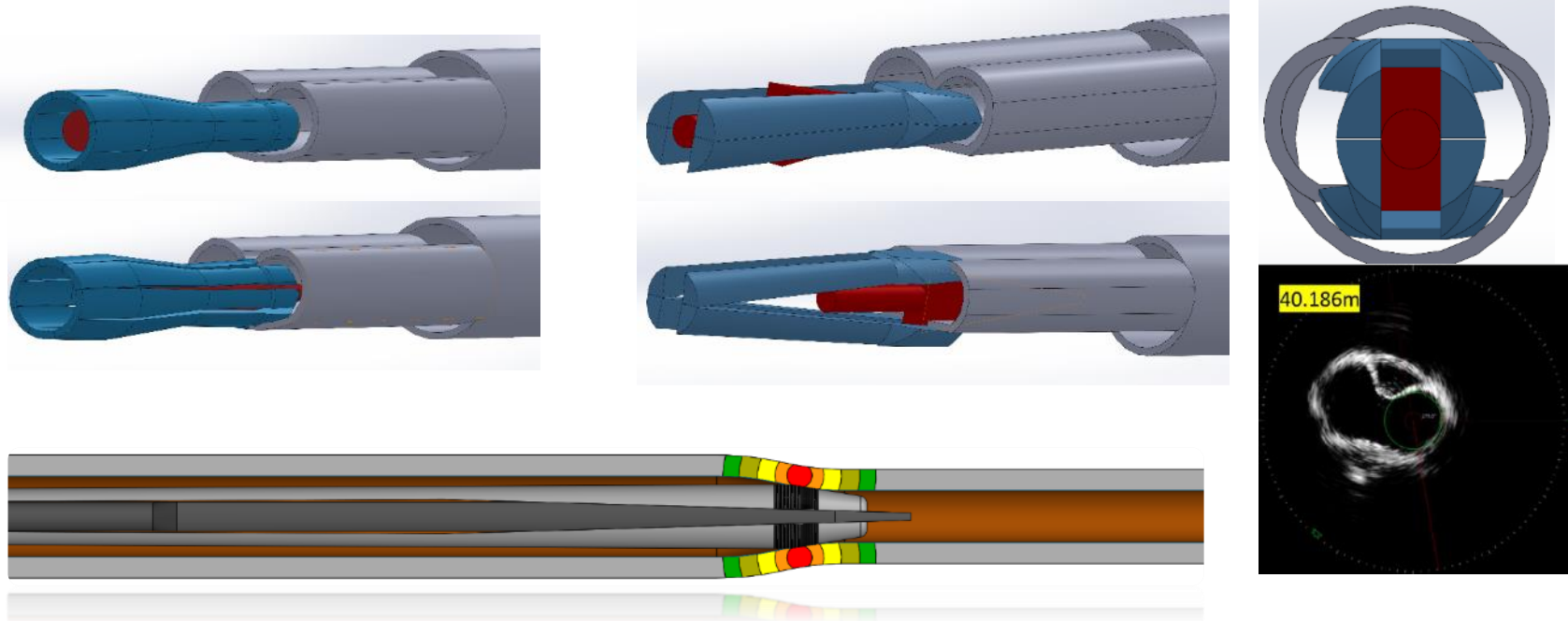
- Non-explosive perforator
- Make multiple holes in the same run
- Create multiple stand-off's in the same run
- Open collapsed tubing using **radial** forces (non axial)
- Set and release crown plugs



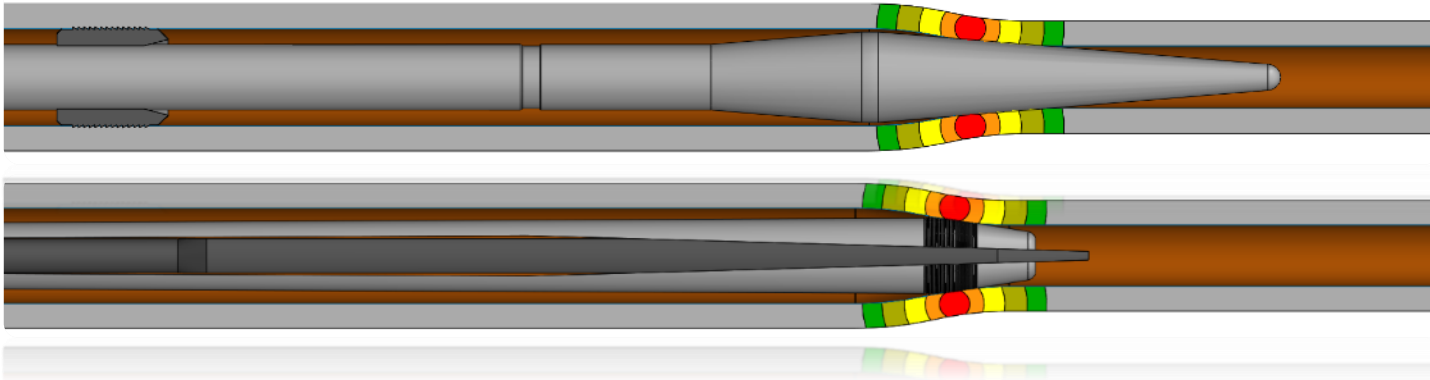
TorcExpansion

Local Expansion Tool:

- Collapsed specified opening tool
- Using radial forces
- Controlled forces
- Surface signature



TorcExpansion



Tubing size	Available Radial pushing force (2x wedge 3°)	Available Radial pushing force (2x wedge 12°)	Required Radial expansion Force to rupture (2 wedge)
4 ½" 12.6# L-80	*570 000 lbs	240 000 lbs	**155 000 lbs
5 ½" 20# L-80	*570 000 lbs	240 000 lbs	**168 000 lbs
5" 23# Q-125	*570 000 lbs	240 000 lbs	**420 000 lbs
6 5/8" 65.7# Q-125	*570 000 lbs	240 000 lbs	**1000 000 lbs

*Various angles of the wedge design will yield more available forces

**Required forces to burst tubing. Less force to start expansion is required

Conservative numbers for radial expansion of tubing to fracture (tensile) is used.

TorcDesperado with pulling tool and anchors



- Torc Desperado for push/pull
- Slips anchor or dogs to fit profile
 - Mechanically operated
 - Single direction or dual direction?
 - Contingency retract mechanism via MRM
- GS pulling tool
 - Pull up to release crown plug
 - Stroke down to release GS pulling tool
- Next step:
 - Setting two crown plugs in one run...

604202-10 - Technical Specifications TorcPlug and EMT system 27.08.2019

TorcPlug and EMT		4 1/2" TorcPlug System		5 1/2" TorcPlug System		5 1/2" TorcPlug M2		7" TorcPlug System		7" TorcPlug Stimulation System	
Physical	EMT OD	90,2mm	3,55in	90,2mm	3,55in	90,2mm	3,55in	90,2mm	3,55in	90,2mm	3,55in
	TorcPlug OD	91,4mm	3,60in	106,4mm	4,19in	106,4mm	4,19in	142,2mm	5,60in	142,2mm	5,60in
	Primary Fishing neck (on TorcPlug)	66,0mm	2,60in	79,4mm	3,13in	66,0mm	2,60in	79,4mm	3,13in	79,4mm	3,13in
	Secondary Fishing neck (on TorcPlug)	74,5mm	2,93in	88,9mm	3,50in	74,5mm	2,93in	88,9mm	3,50in	88,9mm	3,50in
	EMT Length	2,70m	8,86ft	2,70m	8,86ft	2,70m	8,86ft	2,70m	8,86ft	2,70m	8,86ft
	TorcPlug Length	1,88m	6,17ft	1,87m	6,13ft	2,00m	6,56ft	2,35m	7,71ft	2,35m	7,71ft
	Combined Length	4,30m	14,10ft	4,42m	14,50ft	4,47m	14,66ft	4,81m	15,78ft	4,81m	15,78ft
	EMT Weight in air	80kg	176lbs	80kg	176lbs	80kg	176lbs	80kg	176lbs	80kg	176lbs
TorcPlug weight in air	67kg	147lbs	80kg	176lbs	93kg	205lbs	195kg	429lbs	195kg	429lbs	
Mechanical	Tensile Strength	170kN	37.400lbs	230kN	50.600lbs	230kN	50.600lbs	420kN	92.400lbs	420kN	92.400lbs
	Compressive Strength	400kN	88.000lbs	600kN	132.000lbs	600kN	132.000lbs	1.000kN	220.000lbs	1.000kN	220.000lbs
Operational	Max Absolute pressure	2069bar	30000psi	2069bar	30000psi	2069bar	30000psi	2069bar	30000psi	2069bar	30000psi
	Max differential pressure from above (tested to)	793bar	11499psi	620bar	8990psi	700bar	10150psi	689bar	9991psi	689bar	9991psi
	Max differential pressure from below	345bar	5003psi	345bar	5003psi	700bar	10150psi	517bar	7497psi	517bar	7497psi
	Max Temperature	160°C	320°F	150°C	302°F	131°C	268°F	130°C	266°F	130°C	266°F
	Max supported setting ID ***	108,0mm	4,252in	128,2mm	5,047in	129,8mm	5,110in	167,9mm	6,610in	167,9mm	6,610in
	Max V0 ID [1] *	107,3mm	4,224in	125,86mm	4,955in	127mm	5in	161,48mm	6,357in	161,48mm	6,357in
	Max V0 ID [2] **	-	-	127,8mm	5,031in	-	-	157mm	6,18in	-	-
	ISO 14310 V0/Q1 (API Spec. 11D1) envelopes [1]	↓5000 PSI @2-160°C		↓5000 PSI @4-120°C		↓7500 PSI @20-131°C		↓7500 PSI @4-130°C		↓7500 PSI @3-135°C	
	ISO 14310 V0/Q1 (API Spec. 11D1) envelopes [2]	-		↓5000 PSI @30-150°C		-		↓7500 PSI @20-138°C		-	
	Max recommended amount of settings (before inspection)	5		5		5		5		5	
Available torque	5600Nm	4118lb-ft	5600Nm	4118lb-ft	5600Nm	4118lb-ft	5600Nm	4118lb-ft	5600Nm	4118lb-ft	

Current maximum pressure and temperature ratings are defined by actual qualifications according to ISO14310

Different max ratings can be achieved with dedicated V0 qualification.

* - Corresponding to ISO 14310 V0/Q1 (API Spec. 11D1) envelope [1]

** - Corresponding to ISO 14310 V0/Q1 (API Spec. 11D1) envelope [2]

*** - Maximum supported setting ID equals AXD OD when it is maximum expanded.

Setting in a higher ID will result in extrusion gap between tubing and AXD potentially damage the packer element.

At this setting ID there is still some extrusion areas (See figure 1.)

Settings in higher ID have been successfully completed, verify with R&D department if higher setting ID is applicable.

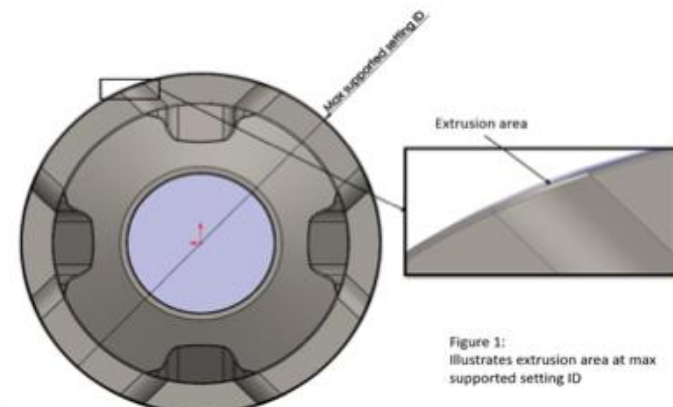
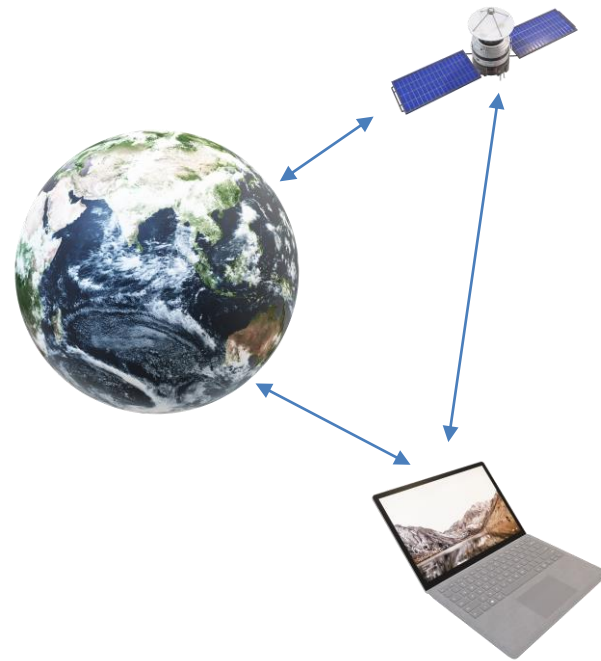


Figure 1:
Illustrates extrusion area at max supported setting ID

Integrated Operations (IO)

- TorcMethod platform fully operational through wireless communication.
- Enables worldwide remote support.
- Enables remote operations globally through training of 3rd party operators for equipment handling on site.
- Equipment maintenance and support locally worldwide for quick turnaround.
- Ideal for Remote Support





Questions and Answers

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Case Studies

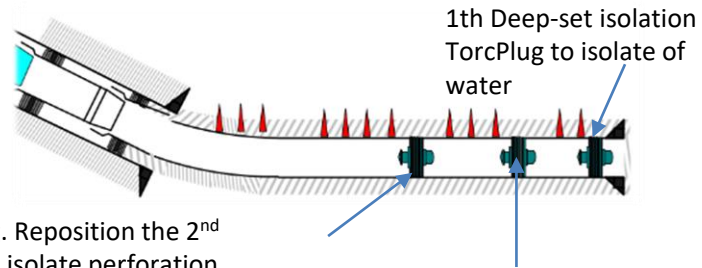


Save Time and Risk on multiple zone acid stimulations

- Installed 1st TorcPlug to shut off lower zones
- Installed 2nd TorcPlug to isolate perforations
 - Perforate and stimulate new zone above TorcPlug
- Release plug move up and re-set to isolate stimulated zone
 - Perforate and stimulate new upper zone
- Retrieve plug

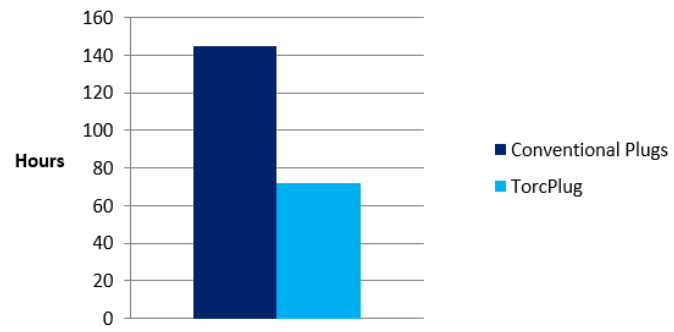
Next optimization step for acid stimulation

- Monobore reservoir liner, no id restriction
- Optimize the perforation target for the reservoir with mechanical perforation tool or perforation guns together with TorcPlug
- Perform multiple acids stimulation whilst attached with the E-line at target depth
- Optimize the stimulation/fracking process for the cluster
- Individual clean up for each added cluster
- Reducing further time and cost

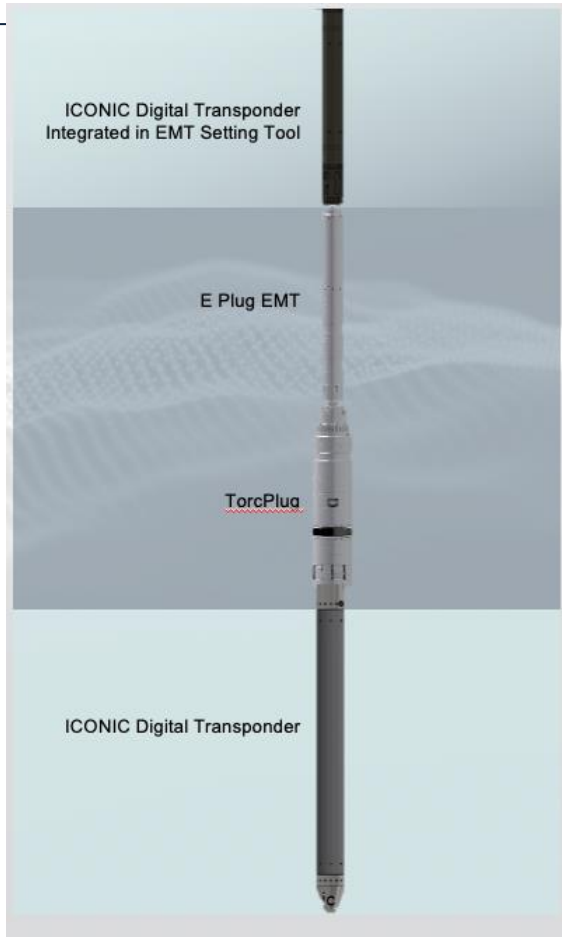


3rd TorcPlug. Reposition the 2nd TorcPlug to isolate perforation. Perforate and stimulate zone above the 3rd TorcPlug

2nd TorcPlug to isolate perforation. Perforate and stimulate zone above TorcPlug - Multiset



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Capabilities

- Real Time and/or memory monitoring over several TorcPlugs; P&T or other measurements
- Compatible with all tractors and logging tool strings in the market
- Run as part of the TorcPlug and EMT assembly
- On demand activation + memory
- Surveillance longevity; up to 10 years longevity if required
- Wireless communication capabilities to EMT or surface station

Used for optimizing the stimulation operations

- Under stimulation – pressure and temperature behavior above and below the plug
- Pressure behavior when flowing or backflowing from reservoir

Used for reservoir surveillance under production

- When plugging of parts of the reservoirs – you can monitor the pressure build up below the plug (same usage as a PDG)
- SIP; Determining flow allocation by flowing over the TorcPlug when un-set or set, but still locked in with slips.

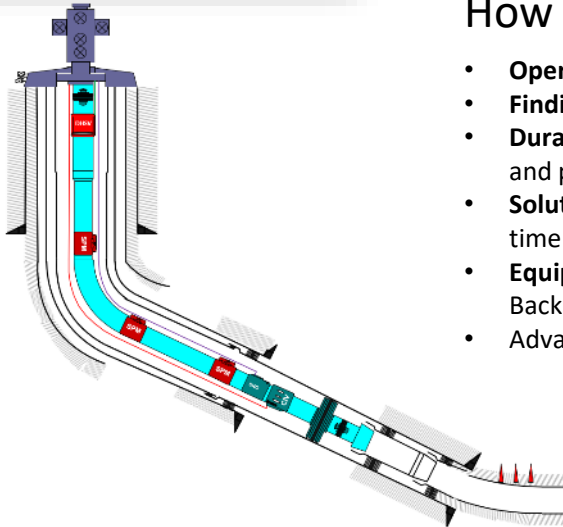




Land rig leak detection application

Client wellbore challenge

- Estimated a leak in the production tubing below the wellhead
- Be able to re-position multiple times to identify leak in wellbore



How was it resolved by running TorcPlug

- **Operation:** The TorcPlug was set and unset 16 times in the same operation
- **Findings:** There were 2 different leak paths identified with the TorcPlug
- **Duration:** The leak detection operation was performed over two days saving a lot of time and potential risks
- **Solution:** The client could proceed with the correct solution for fixing the leak and saved time and potential risk
- **Equipment:** The job performed with standard TorcPlug equipment package (primary and Back Up)
- Advantage: Less footprint onsite

E Plug Confidential



- **Achievement:**

- 7" TorcPlug secured severely scaled setting area using directly surface readout feedback.

- **Application:**

- Barrier due to leaking DHSV

- **Challenge and Solution:**

- Several run with brush in combination with acid without successful DHSV inflow test
- Camera was also run to check for any damages without success
- TorcPlug was run to secure well
- Clear feedback from surface readout system that TorcPlug was set in scale on 1st and 2nd setting
- Scale was "crushed" or minimized on 1st and 2nd setting
- Successful 3rd setting, again confirmed by surface readout system
- Successful inflow test with EMT (running tool) still attached to the TorcPlug
- POOH and rig down

GENERAL OPERATION PRECAUTIONS

Setting in scale/debris/bad tubing - GFA-33 March 2018 – barrier plug:

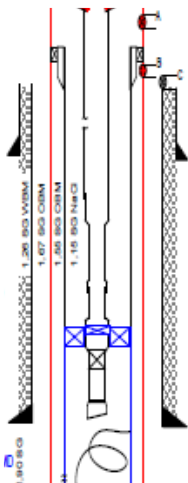


Set plug normal sequence (automatic) -> Current build-up in 2500rpm area -> stopped by user
-> Pulled plug completely by normal sequence
-> Set plug normal sequence and saw same current build-up in 2500rpm area (some more rounds)-> stopped by user
-> Pulled plug completely by normal sequence
-> Set plug in MANUAL mode 1000rpm and stopped @ setting current 630mA – 14781 rounds (current shape Graph 1)
-> Pulled plug partially normal sequence
-> Set plug normal sequence -> stopped automatically @ setting current 630mA – 14798 rounds
-> Pulled plug normal sequence to 11000 rounds (1000rpm area)
-> Set plug by normal sequence -> stopped automatically @ setting current 630mA – 14956 rounds. (Graph 2).

15

Welltec





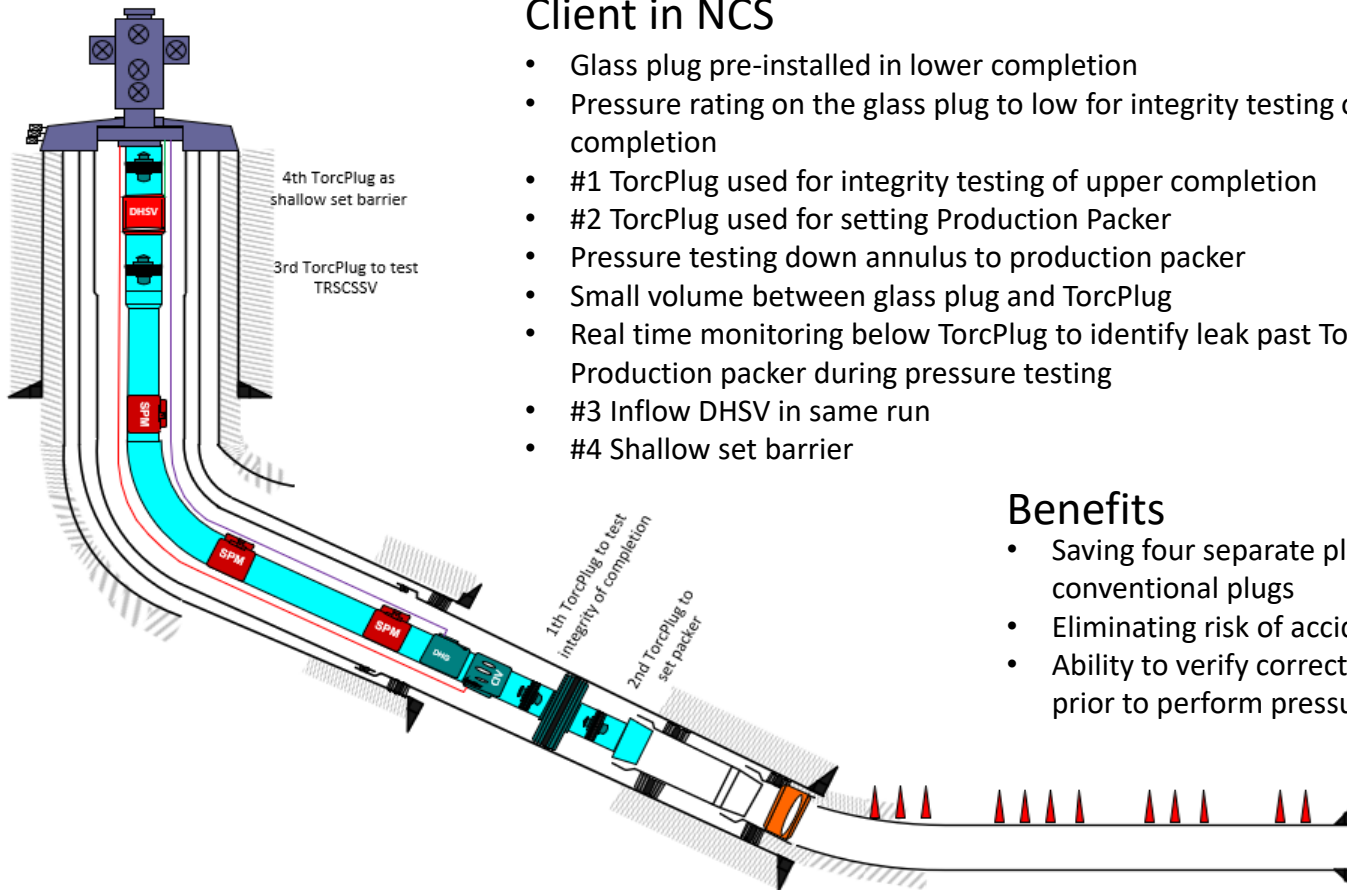
Client in NCS

- Client is required to have a temporary barrier in a P&A well
- 7" Tubing is heavily corroded and eroded
- Caliper Log indicated a 50 meter interval just below the wellhead was a potential suited setting area for the Temporary P&A TorcPlug
- ISO V0 5000 psi differential pressure was required

TorcPlug was chosen for several unique reasons

- The ability to alternate setting force to avoid bursting eroded casing
- The ability to set plug with low setting force and perform low pressure test
- The ability to set plug with full setting force and perform high pressure test
- The ability to re-position the Torcplug in case of a bad setting area
- The ability to verify TorcPlug is set correctly through real time monitoring



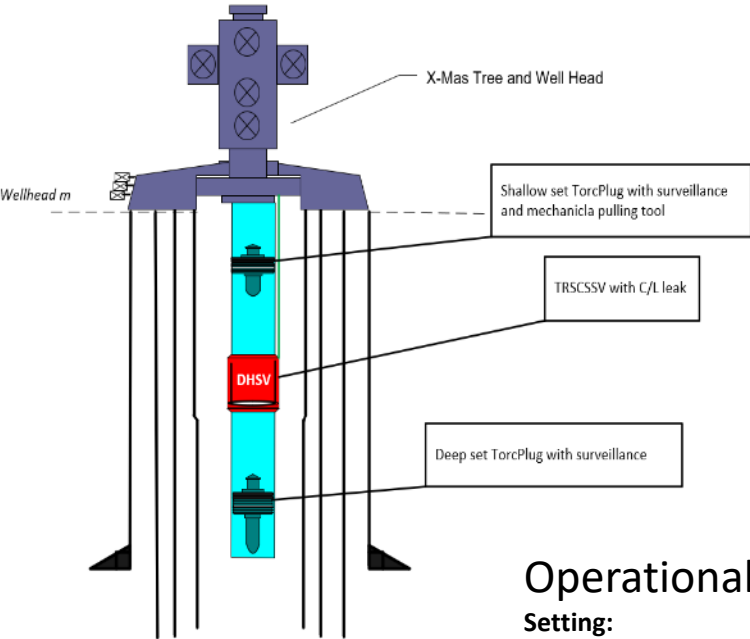


Client in NCS

- Glass plug pre-installed in lower completion
- Pressure rating on the glass plug to low for integrity testing of upper completion
- #1 TorcPlug used for integrity testing of upper completion
- #2 TorcPlug used for setting Production Packer
- Pressure testing down annulus to production packer
- Small volume between glass plug and TorcPlug
- Real time monitoring below TorcPlug to identify leak past TorcPlug or Production packer during pressure testing
- #3 Inflow DHSV in same run
- #4 Shallow set barrier

Benefits

- Saving four separate plug settings and retrieving runs over conventional plugs
- Eliminating risk of accidental bursting Glass Plug
- Ability to verify correct setting of TorcPlug, prior to perform pressure test and setting of Prod packer



Client Well Challenges

- Detect leak in control line
- Tubing to annulus leak
- Improve LWI time spent
- Have the availability to act on unexpected well behavior
- Back Up plug available on the same run

TorcPlug Solution

- **Operation:**
- **Step #1** Deep-set TorcPlug with surveillance is ran and set in conjunction with caliper run, IO
- **Step #2** Shallow set TorcPlug with surveillance and mechanical pulling tool
- **Step #3** Retrieve shallow set TorcPlug and retrieve deep-set TorcPlug
- **Step #4** Pull out of hole

Operational savings and improvements

Setting:

- 1 run for setting the lower plug - Plug set in conjunction with caliper run

Pulling:

- 2 runs for pulling the plugs – attached to the upper TorcPlug and pulling in the deepset plug in the same run

Surveillance:

- Both TorcPlug's are equipped with P/T gauges to monitor well behavior to gather information to get a better understanding of well behavior under testing