



Best practice cut & pull in Equinor

Morten Hovland, Leading Engineer Drilling Engineering

Topics



- Statistics
- Combined solutions – save runs
- Combined cut, pull & jack
- Cut & pull including perf & wash
- New technology ongoing in Equinor

Statistics



Equinor is daily performing around 35 drilling & well operations on NCS.

With drill pipe we are yearly performing:

- 125 cut
- 140 pull
- 50 combined cut&pull operations with jack.

Combined solutions – save runs

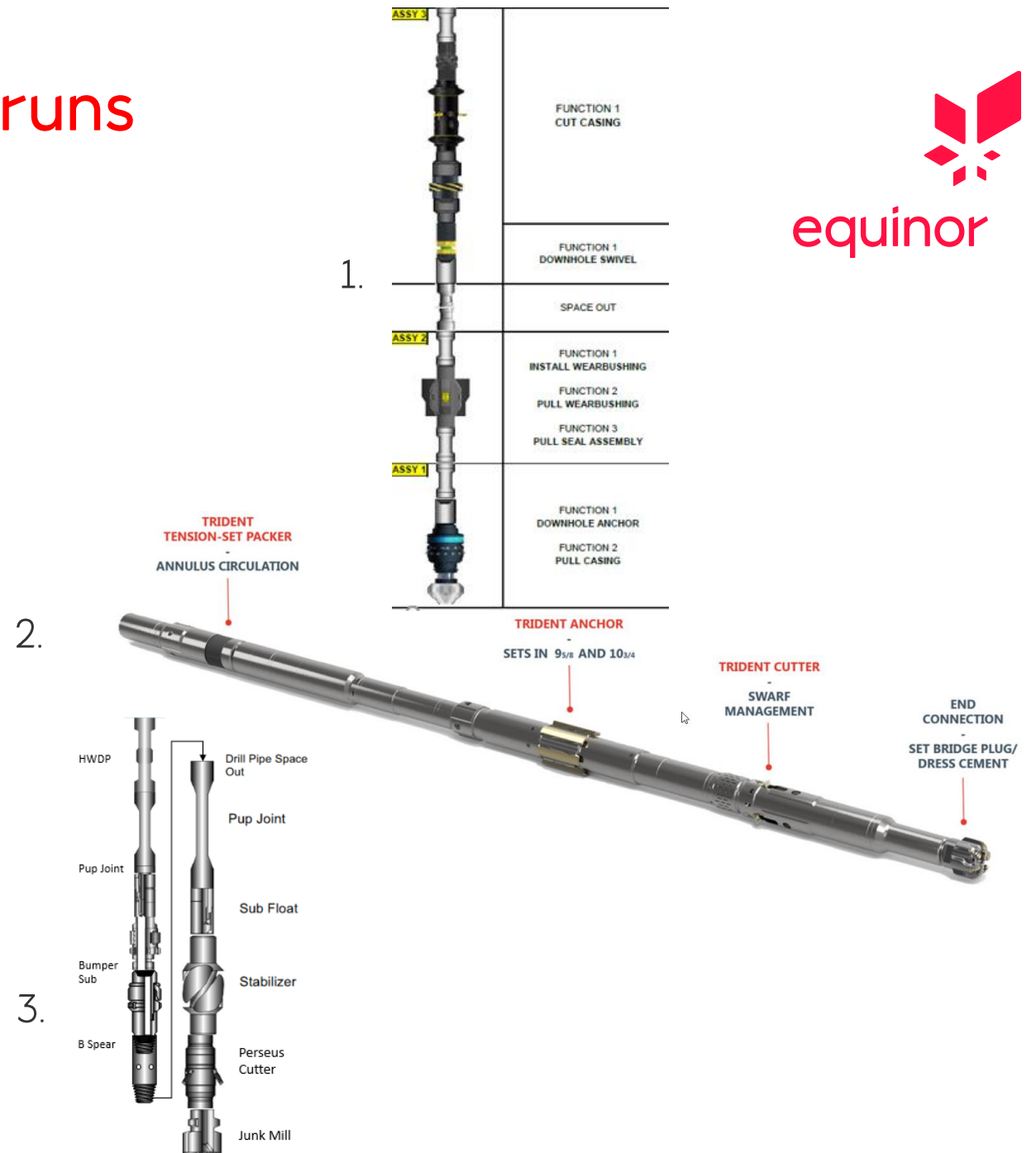


Typical combined solutions for saving trips

- Set cement plug
- Dress cement
- Install different type of plugs
- Install & pull wear bushing
- Pull seal assembly
- Cut casing, several cuts if needed
- Circulate through cut
- Circulate excess cement/clean string
- Pull casing (always fish/casing to surface)

Most used systems today:

1. Archer (Samurai cutter system)
2. Ardyne (Trident cutter system)
3. BakerHughes (Perseus cutter system)



Combined cut, pull & jack system



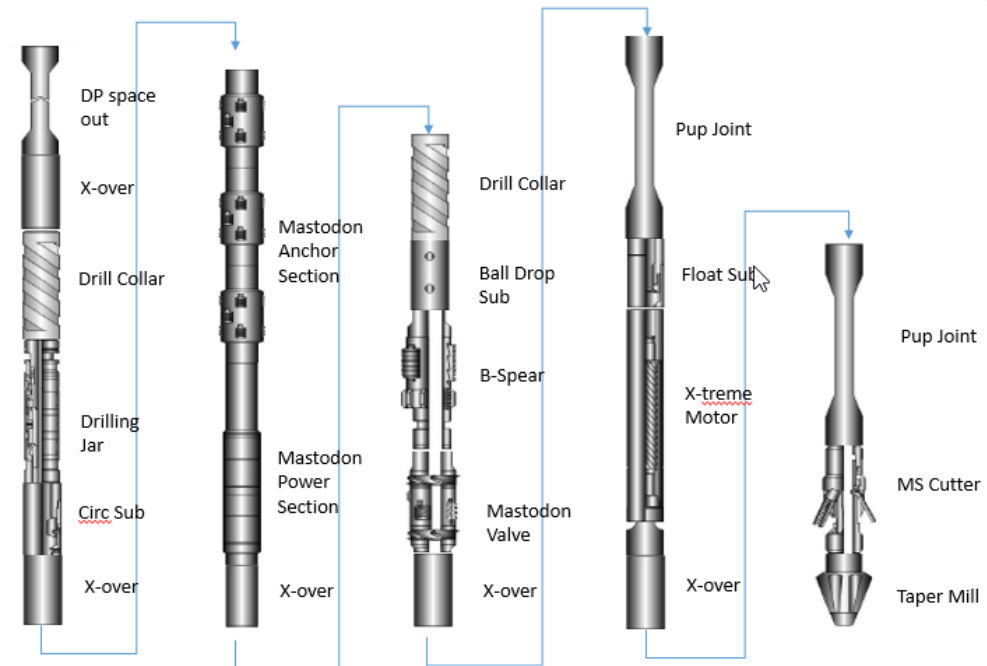
We are currently using 2 systems:

Ardyne – Titan system

BakerHughes – Mastodon system

- Both system can be activated and de-activated downhole
- Always fish to surface
- Can pull up to 800 / 900 Ton
- Can stroke 90 cm / 60 cm per section installed


More safe - no jarring forces on drill pipe, derrick or top drive system



Cut & Pull including Perf & wash

Operational steps:

- RIH w/ BHA assemblies
- RIH to desired perforating depth
- Activate guns and perforate casing.
- Activate CCR washing tool
- Wash stuck casing down.
- Set CCR Packer Anchor and verify free casing.
- Optional, wash more if not free above
- Recover casing to surface
- Release Packer Anchor and L/D casing

DESCRIPTION	SERIAL NR	BHA SCHEMATIC	OBJECTIVE
Customer	Rig	-	Operation
equinor	Field	-	CASING RECOVERY
	Well	-	Archer
DP to surface	RIG		SPACE OUT
PJ			FUNCTION 1 VERIFY FREE CASING
XO			
CCR PACKER ANCHOR			
PJ			FUNCTION 2 RECOVER CASING
CCR WASH ASSY			
FILL SUB FIRING HEAD			FUNCTION 1 REMOVE DEBRIS / ANNULAR FRICTION
DETECTOR BODY			
TIME DELAY			
TIME DELAY			
AUTO GUN RELEASE		FUNCTION 1 FIRE GUNS	
SAFETY SPACER			
GUN ASSEMBLIES		ASSY 2	FUNCTION 1 SAFETY SPACER
BULL NOSE		ASSY X	FUNCTION 1 PERFORATE CASING



New technology ongoing



- Clean up in same run as cut, pull & jack (Ardyne) after pull of one piece baryte settled casing
- Vibration (agitator from NOV) in same run as cut, pull & jack when casing stuck in baryte
- CBB (cement bond breaker)
- More/new combined cut & pull solutions

Summary



High and increasing job volume

More combined runs saves time

None of the vendors can supply all services or tools

Equinor is willing to test new technology