50 per cent faster drilling – with APS active damper

APS Technology has developed a system to keep your drillbits in constant contact with the formation by reducing bit bounce and stick slip– which could help you drill 50 per cent faster, and make your drill bits last 25-30 per cent longer.

Connecticut company APS Technology Inc has developed an Active Vibration Damper (AVD™) for drilling, which can enable rate of penetration to be increased by 50 per cent, and make each drillbit last 25 to 30 per cent longer, whilst helping to protect MWD/LWD electronics.

It has already been used to drill 8 wells in Texas and Wyoming.

The AVD uses a patented damping valve section employing a proprietary fluid containing micron sized magnetic particles, which changes the tool's damping characterictics when a magnetic field is applied.

This fluid technology, known as "magnetorheological", was originally developed over 100 years ago, and has been used as a damper on Ferrari cars, but this is the first time it has been used to stabilize drillbits.

Drill pipe is typically an inch or more smaller in diameter than the drilled hole, so there can be a lot of rattling about, also known as "whirl". Weight-on-bit (WOB) and rotating speeds may vary from moment to moment.

Stabilisers are commonly used to try to stop the drillpipe from whirling, but sometimes the stabilizers and drill bit get stuck as the drill pipe rotates and moves downwards, and then periodically jerk, a phenomenon known as "stick/ slip". Another type of harmful vibration is axial vibration or "bit bounce".

The force a drillbit makes against the rock due to whirl, stick/slip and bit bounce can exceed 50 times the acceleration due to gravity (g), a force big enough to cause a lot of damage to the drillstring components including bits stabilizers and MWD instrumentation..

The AVD is designed to detect and adapt to the resulting vibrations within milliseconds.

Normal dampening techniques (such as springs) do not work as well for stabilizing drillbits, because the level of vibration damping is constant – and sometimes drillers need a lighter or stronger damping coefficient to get the smoothest ride. Spring may also oscillate at certain speeds.

The APS tool constantly measures the forces on the drill bit, and how viscous the dampening fluid around the drill bit needs to be, to keep the drillstring properly damped. A magnetic field of appropriate strength is applied around the MR fluid which causes it to change viscosity. The MR fluid changes from a free flowing oil to a extremely viscous grease (with viscosity of cold peanut butter) in milliseconds. The viscosity of the MR fluid and therefore the damping characteristics of the AVD tool can be continuously adjusted based on drilling conditions.

The magnetic field used to change viscosity of the MR fluid is created by large coils, which use up to 150 watts of direct current electricity generated by a mud turbine alternator -- also made by APS Technology -- within the AVD.

"I like to refer to it as a damper with a programmable viscosity oil," said Steve Andersen, vibration product line manager with APS.

The company won funding from the US Department of Energy to develop the idea, and it also partnered with a drilling company for a certain period of time (under requirements for DoE funding that companies must be in partnerships).

Dirk Bosman, regional manager for Middle East and North Africa with APS, believes that the company has faced some obstacles in AVD's take-up, because it relies on the support of drilling companies – who also make a lot of money selling drillbits – and are not so keen on any technology which makes the drillbits last longer.

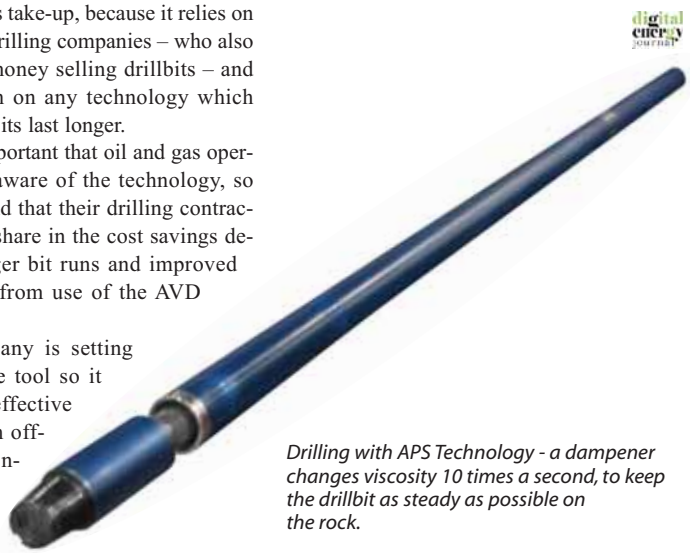
So it is important that oil and gas operators are well aware of the technology, so they can demand that their drilling contractors use it and share in the cost savings delivered by longer bit runs and improved ROP resulting from use of the AVD tool.

The company is setting the price of the tool so it will be cost effective when used both offshore and onshore.

Many of the staff of

If the drill bit is steadier, it can drill much faster

APS were previously employees of a company called Teleco Oilfield Services, which was acquired and became Baker Hughes INTEQ in 1992. Teleco was the first company to develop commercial measure while drilling (MWD) tools in the late 1970s.



Drilling with APS Technology - a dampener changes viscosity 10 times a second, to keep the drillbit as steady as possible on the rock.